April 9, 2003

MEMORANDUM **UTAH DEPARTMENT OF TRANSPORTATION**

TO: Jim McMinimee, P.E., Chairman

FROM: Farrell Wright
Secretary, Standards Committee

SUBJECT: Standards Committee Meeting Minutes and Next Meeting

The next meeting has been scheduled for Thursday, April 24, 2003 at 8:00 a.m., in the main 1st floor conference room of the Rampton Complex. The agenda for the meeting follows.

	Item	Remarks	Sponsor
1.	Minutes of February 27, 2003	For approval	Farrell Wright
2.	Standard Specification 02705, Pavement Sawing	For approval	Ed Rock
3.	800 Series Standard Drawing Conversion Process	For approval	Robert Hull John Leonard
4.	Standard Drawing PV 8, Rumble Strips, Centerline Process Update	For discussion	Robert Hull
5.	Standard Drawings, BA 4 Series and Standard Specification 02841, Traffic Barriers	For approval	Glenn Schulte
6.	Standard Drawings, CC 7 and CC 8 Series	For approval	Glenn Schulte
7.	Effective Date and Implementation of Approved Standards	For discussion	Farrell Wright
8.	Standard Summary Sheets	For approval	Fred Doehring
9.	Standard Specification 00725, Scope of Word	For approval	Darrell Giannonatti
10.	Standard Specification 13554, Polymer Concrete Junction Box	For approval	Jason Richins
11.	Review of Assignment/Action Log	For review	Jim McMinimee
12.	Meeting Improvements (on-going agenda item)	For discussion	Jim McMinimee
13.	Other Business		

JCM/ba
Attachments

cc:

Ahmad Jaber
Director, Region One

Randy Park
Director, Region Two

Tracy Conti
Director, Region Three

Dal Hawks
Director, Region Four

Sterling Davis

Dave Nazare

Darrell Giannonatti

Hugh Kirkham

Tim Biel

Stan Burns

Robert Hull

Jason Davis

Farrell Wright

Barry Axelrod

Carlos Machado, FHWA

Mont Wilson, AGC

Listing of BA 4 Series Standard Drawings on Agenda

BA 4D, Beam Guardrail Single Rail Buried Terminal
BA 4E, Beam Guardrail Buried Terminal With Rub Rail
BA 4F, Beam Guardrail Buried Terminal Anchors
BA 4G, Guardrail Typical 2 Lane 2 Way Installation
BA 4H, Guardrail Typical Multi Lane Arterial
BA 4I, Guardrail Typicals Divided Roadways
BA 4J, Beam Guardrail Nested Guardrail 12’ 6” Span
BA 4K, Beam Guardrail Nested Guardrail 18’ 9” Span
BA 4L, Beam Guardrail Nested Guardrail 25’ Span

Listing of CC 7 and 8 Series Standard Drawings on Agenda

CC 7 A, Grading & Installation Details Crash Cushions Type F
CC 7 B, Grading & Installation Details Crash Cushions Type G
CC 8A, Grading & Installation Detail Crash Cushion Type H
CC 8B, Grading & Installation Detail Crash Cushion Type H

February 27, 2002

A regular meeting of the Standards Committee convened at 8:00 am, Thursday, February 27, 2002, in the 1st floor conference room of the Rampton Complex.

Members Present:

Jim McMinimee	Project Development	Chairman
Jason Davis	Engineering Services	Member
Farrell Wright	Standards and Specifications	Secretary
Tracy Conti	Region 3	Member
Dave Nazare	Structures	Member
Darrell Giannonatti	Construction	Member
Robert Hull	Safety	Member
Sterling Davis	Maintenance	Member
Tim Biel	Materials	Member
Mont Wilson	AGC	Advisory Member
Carlos Muchado	FHWA	Advisory Member

Members Absent:

None

Staff:

Barry Axelrod	Standards and Specifications
Patti Charles	Standards and Specifications
Larry Montoya	Traffic and Safety
Boyd Wheeler	Structures
Lynn Bernhard	Maintenance
Bill Lawrence	Materials
Barry Sharp	Research
Betty Purdie	Region 2
Stan Burns	Research
Ed Rock	Region 2

Visitors:

Roland Stanger	FHWA

Standards Committee Meeting

Minutes of the February 27, 2003 meeting:

1. Minutes of December 19, 2002 meeting were approved as written.

   Motion: Jason Davis made a motion to accept the minutes as written. Seconded by Bob Hull. Passed unanimously.

2. Files and Format for Standards Committee (Agenda Item 2) – Item presented by Barry Axelrod.

   Barry said that with the implementation of the Electronic Plan Room, all specifications need to be in MSWord format. All Standards have been converted and are available on the Shared Drive. Training has been provided for the Complex and Regions. The training covered converting the WordPerfect files to Word and the formatting of the Word files. Barry said the main thing he wanted to point out is all specifications coming to the Standards Committee need to be in the new Word format. Committee members need to get that information out to their people. In response to a comment, Barry said that each of the regions should be set up in Word. ISS can provide support in this area. If a person needs Word all they have to do is contact the ISS technical support person in their region. Barry said the Standards Section is available to provide additional support and training.

   Barry went on to explain the use of the Specification Book in pdf format with change one and two. He pointed out that the book would remain static for the remainder of the year. Changes will be posted separately. The book or changes can be accessed from the Bid Opening Table or the Standards web area for printing or viewing as required. The applicable Table of Contents for projects references the book so specifications don't have to be put in each project. The procedure is the same as with the 1999 book except the current book is electronic, not hard copy.

   Discussion points were:

   - Mont commented about questions he was asked about Supplemental Specifications. Barry pointed out that Supplemental Specifications are not being used with the 2002 Standards. Approved changes become Standards and are available as part of the appropriate change. To get a hard copy of the specification book Barry said you would print the main pdf file. Each change could be printed and posted to the book by the user. Barry pointed out the main book will not be put out until the January 2004 time frame. Mont summarizing, asked if a Contractor downloads the Standard Specifications and the Special Provisions does he have all the specifications for that project.

- Barry said that whenever the Standards web page is updated, whether for a specification, drawing, special provision, Standards Committee, or related informational change an email to the Standards Update Subscription group is sent. Clarifications are also sent to the subscription group.

3. Standard Specification 01284, Prompt Payment (Agenda Item 3) - Item was to be presented by Chuck Larson.

   Jim advised the committee that the item has been postponed. He asked if anyone had any comments.

   Darrell provided information on the direction being taken. He said they were going to look at the specification with an eye on making it a standard for all jobs, not just Federal jobs. Since that time there have been more discussions and a suggestion for a better way to perform the task without being so administratively intensive. More work needs to be done on the specification so Darrell asked that the item be tabled.

   Action Item: Construction to work on the specification. The item will be shown as open with no date. Construction will advise the Standards Section on progress.

4. Standard Specification 02705, Pavement Sawing (Agenda Item 4) - Presented by Ed Rock.

   Ed said based on comments from the last meeting he contacted the AGC and talked to Kip Wadsworth, President of AGC. Kip indicated that most of his constituents were opposed to the idea because they felt it was adding to the trend by UDOT of putting more risk and responsibility on the Contractor like what had been done with lump sum traffic control. Ed commented that UDOT has backing off in some areas, like traffic control. Ed says that we are making efforts to accommodate the Contractor. Referring to a Saw Cutting Cost table submitted as part of the submittal sheet, Ed said that in most cases the cost is less than a half percent of the total advertising cost, with a lot being bid at a unit cost of a penny. Ed pointed out that many other items include additional items for payment that are much more risky than pavement sawing. He stated several examples. Ed said it is done this way because it makes good business sense. Ed said while he understands the Contractor's point of view, he still thinks this is the way to go.

   Betty said she had indicated to Kip that UDOT was looking into fixing some of the major lump sum bid items that put a lot of risk on the Contractor. She had asked him if the AGC would be willing to accept paying for saw cutting as part of the removal item if some of the more risky lump sum items could be fixed. Kip had agreed that would be a possibility.

Discussion points were:

- Comments indicated that the Department might be paying more for contract management than what is being paid to the Contractor.

Ed indicated the only change to 02705 was to article 1.3, Payment Procedures. The Department would make no separate payment for Pavement Sawing and that it would be included in associated bid items.

Discussion points were:

- Farrell said he didn't see a problem with the change, adding that a lot of time has been spent trying to determine pavement thickness. A best judgment is made but once sawing begins a different thickness is discovered.

- Discussion continued in reference to the cost table presented by Ed. Mont suggested that if you have a large sawing cutting quantity, more than $5,000 for example, then there should be a separate bid item.

- Betty said that depending on the circumstances of a project, quantities are hard to estimate. Sometimes the pavement is saw cut and sometimes it is just excavated. In response to a question, she said she recommends using this on all jobs.

- Ed said he would make this an issue for the next engineers meeting.

- Dave said he was fine with the direction that is being taken, but he did want to follow up on something from last meeting. Last meeting Mont asked what did UDOT accept as a saw cut. Dave didn't think that had been resolved. Mont thought it could be a Contractor option. He said call it sawing cutting but give an alternate method. The Resident Engineer could make the decision on the use of the alternate method.

- Is rotomilling considered a sawed edge? Betty said an edge that can be tied into is needed. What methods would be unacceptable? Betty said instead of defining the method, why don't we define what the edge needs to be. During the discussion a suggestion was made to possibly changing the title to Pavement Cutting instead of Pavement Sawing.

- Comments suggested if other options are going to be allowed then they need to be spelled out. Tim said another issue to consider is whether it is a permanent or temporary issue. A clean-cut joint is more important for something with a 20-year life cycle.

- If the title is changed specifications that reference 02705 will have to updated as well. Someone asked if a change approved by the Standards Committee goes into effect immediately or will it be held until the next book comes out. When will this change be implemented?

- Barry explained that the main book with changes one and two will not change for the remainder of the year, however newly approved specifications will be made available as part of change three, four, and so forth. Each change will be referenced in projects. Barry said that if for example 30 other specifications were impacted by this change in title then those specifications would have to be changed as well. Barry explained that a few years ago a similar type change was handled with a memo or something similar that stated all references in the specification book to a particular item are now changed to the new item. He said he would have to do some research to find out the details. A change to each of the specifications would not be needed in that case. Jim asked the Standards Section to come back with a recommendation on how to handle this.

- Someone asked if two different specifications are needed. One specification can handle both concrete and asphalt.

Action Item: Ed will take the item back for further review and update based on meeting comments and recommendations. Standards to determine how to handle a section title change.

5. Standard Specification 02316, Roadway Excavation; 02222, Site Demolition; and 02224, Dispose of Asphalt Pavement, (Agenda Item 5) - Presented by Ed Rock.

   Ed said they went back and talked to Contractors on the proposed changes based on comments from the last meeting. Ed's proposal was to pay the item under Roadway Excavation. The item can be bid as one-cent or a lump sum, depending on the disposition of the item as to whether it is reused or hauled away for disposal.

   Discussion points were:

   - Comments indicated that measurement could be difficult because of the circumstances. Asphalt and other materials may be removed at the same time as the contractor is moving along.

   - Jim said that while the Resident Engineers and Technicians seem to be in favor of the change, Construction Engineers were not contacted. He said this would give another perspective.

   - Mont said the key is to give the Contractor as much information as possible so he can make an assessment of the cubic yards to be dealt with and handled.

- Dave said he is in favor of the concept. He added that it gets us out of a lot of construction management that doesn't add any value to the project.

- Jim asked Ed to go through each specification and point out the changes.

In 02316, Ed said 1.2 I for 02224 was added. Payment procedures were clarified. Also 3.9 Asphalt Pavement was added. Section 02224, Dispose of Asphalt Pavement is a new specification. Ed covered 02222, Site Demolition – Pavement next. He said the specification is for concrete pavement.

Discussion points were:

- Dave suggested changing the title of the specification to reflect "Concrete" in the title. With the suggested title change, article 1.3 on asphalt payment procedures can be removed from the specification.

Ed went on to discuss the changes. He said the "perpendicular" reference in 3.2A has been a problem in that the Contractor may cut a rough edge. There were no other changes.

Discussion points were:

- Dave asked how asphalt on concrete would be handled. A special provision would be used in this case.

Motion: Dave Nazare made a motion to approve Standard Specification 02316, 02222, and 02224 as modified. Seconded by Tracy Conti. Passed unanimously.

6. Standard Drawing GW 10, Delineation Application (Agenda Item 6) - Presented by Bob Hull.

Bob said the changes address the use of delineators on exit and entrance ramps. Currently the placement is not always on both sides. The change came about from a project in Region 4. The drawing was changed to show placement on both sides, similar to some actual applications.

Discussion points were:

- Someone asked if the MUTCD called for delineators on both sides of the ramps. No one could remember for sure, but some thought it did.

- Roland discussed some of the placement options set out in the MUTCD. He said while some posts could be removed, it would require moving other posts. Bob said that the drawing was to have had some of the MUTCD recommended placements but it was not in the drawing. The drawing will have to be updated to reflect this. Spacing of delineators was discussed in relation to the 10-foot dimension.

- Sterling said as a general statement the Department tries to maintain things to the standard to which they were built. He said cost is an issue.

- Roland said he had discussed some of the issues with John Leonard. He said they discussed removing the reference to wood post and allow any type.

- In reference to the "L" designation in the bottom detail, someone asked if the "L" is defined anywhere on the drawing. Note 2 designates the values. Someone thought the "See Note 3" in the bottom detail should refer to Note 2. **(Note: I think Note 3 is correct. Need to discuss.)**

- Going back to the earlier question on the MUTCD, Jim commented on following the same logic used in prior discussions of following AASHTO requirements. Are we doing something different with delineators following our Standards and not MUTCD Standards? Is there evidence that we are safer because we are different than MUTCD or is it one of those things where we have said more is better? Bob agreed more is better.

- Sterling said the MUTCD says you can do more than the MUTCD, but not less. Bob said if we go with the MUTCD then we would be taking delineators out. Jim said on the other side of that there might be things that set us apart because AASHTO is an average of 50 states. There may some places or reasons where we want different spacing. Jim commented that our Maintenance area needed to be part of the discussions. Sterling said it wouldn't hurt even with their varied opinions. He said he would run it past them. Sterling said delineators are a valuable tool, commenting specifically on rural areas at night.

- Jim asked Stan if there was a way to see if there was any research involving delineators and the impact on traffic accidents. Stan said that could be looked into to see if there is a relationship. Sterling said there are a lot of roads where the accidents are a result of driver error. In those cases the safest things you put out will not make a difference. The impact may be hard to measure.

- Jim said this gets us back to the discussion we had on going to AASHTO Standards. He said MUTCD is a set of standards arrived at by a consensus of a large group. Why does Utah believe that we are capable of making judgments that are greater than a national standard? The Department decided to adopt AASHTO Standards to save money while demonstrating we were acting in the public good.

- Sterling commented that as you look at the 50 states, about six or eight are as rural as Utah. Conditions in rural states are quite different from the other states so we probably deserve to have something different from the vast majority of the states. Jim said that Stan could look at the rural states and see if there is a consensus.

- Sterling said some states have their own MUTCD, but can't be less restrictive. Jim asked if that wasn't what we have in effect here with respect to delineators. Sterling said yes but not as a total document. He went on to say that some states have a total document that covers the entire MUTCD.

- The item should be ready for the next meeting.

Action Item: Research to look into the use of delineators and the impact on traffic. Research also to look into standards common to rural states in relation to the MUTCD. Sterling to coordinate changes within the Maintenance Division.

7. 800 Series Standard Drawing Conversion Process, (Agenda Item 7) - Presented by Robert Hull.

Robert said a task force reviewed and updated the drawings.

Discussion points were:

- Jason thought there should have been more region design representation in the group. Bob said the group members were more like facilitators, not someone with absolute ownership in the drawings. He thought the members should have gotten more comments from the users. Jason said he believed that the group who put the updates together looked at safety and the AASHTO Green Book and how everything is impacted. He added that he believed the drawings were accurate from that standpoint. However from a usability standpoint of the designer he wasn't sure the drawings were ready.

- Bob said that after putting the drawings together and sending them out for comment you get a significant difference in opinion on a particular detail or area. As an example he said two people in the same area have different opinions on what should be in the drawings. How is this handled? Where do you draw the fine line on what is going to be included in the drawing to present to the Standards Committee.

- Jim said a good example of this could be seen in how Ed Rock presented his information for an earlier agenda item. He brought comments from those diverse groups. The Committee then discussed the issues and arrived at a conclusion. Jim said this is an important issue and the charge of the Standards Committee is to understand those differences.

- Bob said he was concerned that the drawings would not be ready for the next meeting if he had someone accumulate all the information. He said he was asking from the Committee in the way of a recommendation that each person on the task force be responsible for a small portion of going out and getting those comments and compiling the information. This was not a minor undertaking. Bob said they put a lot of effort into the drawings with very limited resources with no contributions from outside the building. He said the Committee needs to take a stand on this because he cannot dictate that to the group. Jason said the group should have decided on how to get the information out. Bob said he didn't think that was the direction given by the Committee. Bob said they went out of their way to put a group together to help on areas they did not feel comfortable with. If now another layer has to be added to the same group to get comments and contributions then so be it. He said he wants that recommendation from this Committee.

- Based on the comments, Jim said he wondered if the submittal form lacks direction in the area of stakeholders. Jim said it sounded like Bob was asking direction from the Standards Committee as to who the stakeholders are. Bob said not necessarily who they are, but guidance on the depth of contact with those stakeholders. He added that each time the drawings come back to the Committee another layer is added. Darrell suggested that could have been solved by putting a region representative on the group right from the start. Bob asked if that was Traffic and Safety's call or that of individuals contacted by the group for recommendations. Jim said it gets back to what is our standard process. In general Jim thought our standard process would be that we had representation from both the Regions and Complex on task groups. Jim said that he didn't know at what point we stop soliciting comments.

- Jason said this doesn't apply to just the 800 series drawings, but should be looked at for all standards. He said this might be something that we need to change on the submittal sheet. Farrell explained how region comments helped formulate the new Electronic Plan Room specification and drawing process.

- The drawings will be brought back to the next meeting.

Action Item: Task group to coordinate and update the drawings as required.

8. Standard Drawing PV 8, Rumble Strips (Agenda Item 8) - Presented by Robert Hull.

Bob said they were given the directive to put centerline rumble strips on parts of SR-6. He said this drawing is their first attempt at updating the drawing.

Discussion points were:

- In regard to painting in the rumble strip, someone asked how that would perform. Bob said there are studies and applications from other states. You actually get higher and longer reflectivity of your pavement marking because of the vertical face of the rumble strip. Tim asked if the paint were thick enough so it wouldn't puddle at the bottom. Bob didn't know. Someone asked Bob if his intent was to make this a standard before the SR-6 job. Bob concurred. Jim said that was the intent. Bob said based on the last discussion (800 series drawings), there aren't a lot of people who have had a chance to look at this drawing as a whole.

- Jim asked Bob if he thought centerline rumble strips had application on the entire system or is it something that will be looked at for spot locations or by some traffic engineering determination. Bob said it would be more along the lines of a traffic engineering determination. Jim said that suggests some kind of a warrant process and there has not been enough time to develop a policy. Jim said what you are getting to is a design drawing for that application on SR-6, maybe making it an experimental project or something so that data can be obtained and the policy worked on. Bob said one of the questions that came up that can be addressed by the Traffic Engineering Panel was why are we using a 20 foot rumble strip.

- Someone asked how the delineation would work during the winter with snow. Bob said it depended on the location.

- Sterling said it doesn't matter whether the driver intends to pass or not. They may just be drifting across the centerline so the rumble strip reminds them of that fact.

- Someone asked if the centerline rumble strip in a passing zone would cause someone not to pass when they normally would pass. Bob said he had heard some concerns in this area. How aggressive do you make the rumble strip? Further, Bob asked if the driver looks at the rumble strip or the pavement markings when making the determination to pass or not. Rumble strips are on the shoulder so does that prevent you from crossing over the line and stopping or doing something. It's just a reminder that you are getting close to the edge. The issue of maintenance and overlays came up as well.

- Jim said long-term decisions are: how do we want to warrant the rumble strips, how are they maintained, and what are the cost implications. Bob said there are a lot of questions on configuration and where they are used, but there is no question as to effectiveness. That is why it is a very attractive item. In other states there have been significant reductions in fatalities when they are used.

- Jim said the question is where do you install them. He added that we still have that question with our regular rumble strips. Farrell said in Wyoming, when they painted over the rumble strip, it looked like a skip line. Jim suggested that a few different methods be looked at. Sterling said a positive thing is that it is changeable. If it is not working very well it can be changed.

- Rumble strips will be brought back next time for discussion of the general issue.

Action Item: A policy is to be developed over the next several months.

9. Standard Drawing GW 2, Concrete Curb and Gutter (Agenda Item 9) - Presented by Robert Hull.

Bob said there is no such thing as a barrier curb so the references were removed from the drawing. This corrects the drawing and should help with incorrect assumptions and determinations.

Discussion points were:

- Mont asked about the size of the untreated base course layer. Tim said standard untreated base would have to be a maximum of inch and a half, minus. Mont asked if any untreated base course, half-inch, three quarter, or inch and a half was suitable. Tim said in his judgment, yes. Jim asked if a note on the usage was needed.

- Someone asked if the pavement needed to be better identified on the drawing. Bob said that area was not something that this change addressed. Arrows will be added to the drawing to show the proper location of the pavement.

Motion: Dave Nazare made a motion to approve Standard Drawing GW 2 as presented. Seconded by Jason Davis. Passed unanimously.

10. Standard Specification 09972, Painting for Structural Steel; 09991, Cleaning and Repainting Structural Steel; and 09992, Cleaning and Overcoating Structural Steel (Agenda Item 10) - Presented by Boyd Wheeler.

Boyd said that he wanted to update the Committee on where Structures is on reviewing and updating the subject specifications. He said they have a committee made up of Industry, Structures, Materials, and Construction representatives reviewing the specifications. He said they have completed a preliminary review. The Materials Division has done a more extensive review with Industry representatives to discuss implications of going with the SSPC certification program for painting on structural steel. Boyd said that Bill Lawrence had told him that one contractor had a concern with it but all the other painting contractors felt that if they had notification and time to prepare they thought it was appropriate.

Discussion points were:

- Some one asked if there was more information on the concern expressed by the one contractor. The response was that the company was a small operation and that they wanted a guaranty from UDOT on a cost issue versus the amount of structural steel to justify the cost. Comments indicated that couldn't be done. Dave said he thought it could be done. He said they could tell the contractor what their painting program was going to be. Tim said you can tell them what you are going to do, but you can't give them extra just to make them happy.

- Boyd went on to explain there are two different certifications within the SSPC program. One allows for painting where there is no hazardous wet waste or red lead removal operations going on. He said that is what will be used for painting new structural steel in the field. The second is for repainting in the field. This allows for a two-step certification process for contractors. Boyd said they are proposing to send out a letter to current paint contractors saying effective in August or September of this year this will be our requirement, giving them four to six months to get the certification in place. He said revised specifications would be presented to the Committee prior to that time frame with the new requirement included. The letter is still being worked on, using letters from other states as examples.

- Someone asked if other states are doing this. The response was yes. In addition, FHWA sent a letter stating they recommend heading to the SSCP requirement. A copy of the FHWA letter was included in the meeting handouts.

- Jim asked where we fell compared to other states in the implementation of the program. Comments indicated two states have programs in place.

- Boyd said the current specification requires the contractor to set up a test section, do a test section, and do an evaluation on a yearly basis for every painter who may work on a project. Having them certify as a company has them risk their certification for not meeting minimum painting standards.

- Jim asked about costs to the contractor. Comments indicated that had not been investigated. Tim said of the four or five painters they deal with, all but one already has the certification. The Industry does more than just structural steel in the transportation field, for example storage tanks are included. Tim said that while we may be in the top 10 for structural steel, the process has been out there for a while.

- Jim asked if Boyd was going to cover specific changes to the specifications. Boyd indicated that no changes were made and that this was an information update.

- Dave said the plan was to send out the letter to let painting contractors know in August or September that updated specifications will be implemented and they have to be SSCP certified. Tim said special provisions are being used on a couple of jobs so they get an idea on the process. The specifications need to be presented to the Standards Committee at the meeting prior to the implementation with properly formatted language.

Action Item: Structures to send letter to paint contractors. The item will be shown with an August 2003 date.

11. Standards Committee Policy 08A5-1, Submittal Sheet Update (Agenda Item 11) - Presented by Darrell Giannonatti.

Darrell said when some specification changes are submitted programming hours may need to be looked at. He said an example is the "A" plus "B" contracting where we have more components than the electronic bid system can handle. It may take 400 hours of programming time to complete the task. Darrell asked if this is something that the Committee should look at prior to approving a change to the standards.

Discussion points were:

- Jim asked if that is part of the cost. Darrell said it could be put there. A decision needs to be made about the impact on our systems including PDA's. Jason asked if that would be a basis for the Standards Committee to either approve or disapprove the specification.

- Barry said that Item D2 on the submittal sheet could be modified to include a programming cost. The item could be fine as is, with just word getting out to those completing the forms about looking at programming costs. Jim said he was comfortable adding programming to the item.

- Jim said there was another discussion we could have. He said he was approached by a group who indicated their name was not on the list of those shown on the form. Preconstruction is not specifically listed on the form. Jim said he thought it was okay that as those things come up we add them in. Farrell asked how far under Preconstruction do you want to go.

- Jason said he wanted to piggyback on this in relation to bringing back summary sheets. They are not Standard Drawings, but will be used on every concept. Farrell said they would become standard summary sheets. Jim thought they should be brought to the Committee. Jason said the summary sheets would be on the next agenda.

- Jim asked Darrell if his question had been answered and if he was comfortable. Darrell indicated it had and that he was comfortable with the direction.

- Barry asked if the form needed to be modified. Jim said to add Preconstruction in the area of those to contact and add programming costs as one of the example costs.

Action Item: Submittal Sheet to be updated with the addition of Preconstruction and Programming Costs.

12. Standard Specification 00555, Prosecution and Progress (Agenda Item 12) – Item was to be presented by Chuck Larson.

Jim advised the committee that the item has been postponed. He asked if anyone had any comments. Darrell said they are looking at the CPM schedule as well as changing some of the preconstruction agenda items. He said they were trying to get some of the changes done quickly and that they didn't go through all the proper channels to get Region Preconstruction to buy into the changes. Darrell said they need to take a step back and work through the changes with Region Preconstruction to make sure everyone is comfortable with the changes.

Discussion points were:

- Farrell asked that they be contacted about writing in active voice when these specifications are put together.

13. Standard Drawing GW 5, Pedestrian Access and Special Provision 02771M, Curbs, Gutters, Driveways, Pedestrian Access Ramps, and Plowable End Sections (Agenda Item 13) - Presented by Larry Montoya.

Larry said that comments from the last meeting have been incorporated. He said the score lines on ends of the detectable warning area that direct someone across the crosswalk were added. The lines were not on the drawing the last time. Typographical errors were corrected.

Discussion points were:

- In response to a comment, Larry said the Special Provision provides for three installations: stamped concrete, fiberglass, and concrete paver. He said the Special Provision has been put in couple of jobs but they have not been built yet. He added that the Contractors are interested most in going with the stamped concrete.

Larry said he also wanted to provide a brief update on a meeting he held with Salt Lake County and Salt Lake City. He invited several other cities including Murray. In that meeting Larry said he went over the proposed ideas on the three materials. He said they all agreed these are good materials to try. Larry said Salt Lake County brought up the idea of trying one of each at one location. This would be a test bed site and they would try to put it in a project late spring this year. All that is needed is to find a project to use for the test.

Larry said he would keep the Standards Committee and the Research Division advised of the progress of the test.

Discussion points were:

- Jason said one of the concerns from the last meeting was the different sound required by ADA. He asked Larry if that were the case. Larry said that only applies to interior installations. He said a contrasting color is needed and that the Special Provision handles it.

- Roland commented about the Van Accessible signing. He showed a picture of the proper signing, with a placard underneath the sign. He said the requirement came out in a memo from FHWA in 1992 and was put in the 1997 MUTCD. However it was left out of the 2000 MUTCD. A change will come out this fall. Roland indicated the drawing needed to be updated.

- Jason asked if he understood it correctly that stamped concrete would be used on all projects. Larry said to ensure that, it would have to be specified. Jason asked how that would be specified. Farrell said the specification would call for what we want but it would be paid for as a pedestrian access ramp, then it wouldn't matter if it is tile, plastic, or concrete. The designer would have to list the desired option.

- Dave asked about the double arrows in the Type E Pedestrian Ramp detail. Larry said they show the direction of the slope in both directions. Dave pointed out that the dimensions and leaders were a little off. The perspective view does not show the lines properly. The dimension should be parallel to the detail.

- Jim asked if the 10:1 slope in the Type D detail was pointing the wrong direction. Larry said that ramp is actually in the street.

- In reference to Note 5 on accessible parking spaces there was a question as to where "accessible parking space" is specified. The asterisk in Figure 2 calls it out. Roland commented that the space adjacent to a van accessible space has to be 96 inches. The drawing does not show that. The detail needs to be checked and corrected if necessary.

Motion: Darrell Giannonatti made a motion to approve Standard Drawing GW 5 as modified. Seconded by Jason Davis. Passed unanimously. Special Provision 02771M to be put on Shared Drive and web.

14. Standard Specification 02892, Traffic Signal (Agenda Item 14) - Presented by Larry Montoya.

Larry said they are proposing revisions to the specification to cover the current design practice of using LED signal lenses in traffic and pedestrian signal heads as well as the use of video detection. He said the changes allow them to use either standard in-pavement loop detection or video detection. Larry said the changes are primarily in Parts 2 and 3 of the specification.

Discussion points were:

- Jim said he understands from the submittal sheet that a number of these are already in use and that there are no concerns from the stakeholders. Additionally Jim commented that the stakeholders feel the devices are maintainable and are cost saving. Larry said that is correct, adding that the cost of video detection has come down over the last few years. It is very comparable in loop detection now. It all comes down to whether a region wants to see it in a particular location or whether it is practicable.

- Jason said typically our maintenance crews didn't have buckets that reached high enough to maintain some of our lighting. In those cases Utah Power and Light provided assistance. Jason asked Larry if the regions now had equipment that could reach high enough so they could maintain the new items. Larry said in most cases Region 4 is the only one having difficulty reaching that level, but the standard now is to mount the cameras on the mast arm so they are more centered in the roadway.

- In response to a question about installation in snow areas and preventing the cameras from being clogged up, Larry said that is covered in design and should be listed in our Signal Guidelines. The specification only covers the parameters and criteria that we would require for those systems.

- Jason asked if there is any addition warehousing costs. Larry said no and that they have been stocking them for some time. He said they are trying to keep a good inventory because the items go fast. Someone asked if the items would be available in a timely manner. Bob said that Larry and Rich in his area have assumed responsibility for the state furnished items and are working on a new process.

- Jim said one of the things video detection is supposed to do is keep wires out of the ground. He asked if that has implications to the number of people we need to have doing locates. Has anybody looked at that? Jim also commented about the LED's in that they last longer, resulting in less maintenance. He asked if anybody had looked at that as well.

- Bob said they are looking at both issues. Bob said the issue is that maintenance is a separate line item from that used to by the items. Bob said what they are going to propose in the long run is the reinvestment of the cost savings back into the state traffic fund so it can be reinvested in more LED's. This will have long-range implications in budgeting and personnel issues.

- Jason asked about training on the video detection systems for the signal crews. Larry said they are getting training from the vendors.

- Larry pointed out another benefit of the LED in that the LED's allow for the use of an uninterrupted power supply at critical intersections such as SPUI's. This would be a safety benefit in power outages. Larry said the power would come from a separate cabinet adjacent to the signal controller with an outlet to allow a generator to be hooked up to the cabinet. He said it would operate up to three hours, giving the crew time to hook up a generator if necessary. Bob said there are documented power outages where no one noticed the signals going out.

- Lynn brought up the issue of snow build up on the lens face. Larry said that is an issue where we get a lot of snow build up. Someone asked if the lens shield length could be changed. This might need to be looked at.

- Larry said we need to make sure the signal heads are mounted vertically and are lined up with the traffic. He said sometimes the wind knocks the signal head out of alignment.

Motion: Jason Davis made a motion to approve Standard Specification 02892 as modified. Seconded by Bob Hull. Passed unanimously.

15. Standard Specification 02721, Untreated Base Course (Agenda Item 15) - Presented by Tim Biel.

Tim said they have been using a Special Provision for a long time to incorporate Recycled Asphalt Pavement (RAP) and Untreated Base Course. He said that Special Provision was incorporated into the Standard Specification. Lot sizes were made easier to deal with. They went with smaller quantities every day as opposed to trying to string together 25 to 30 days worth of small quantities and limited it to two weeks. The rest of the change is RAP content.

Discussion points were:

- Referencing the handout provided by Tim, Mont asked about the requirement that the material must be mechanically blended. He said that the reference to Pugmill envisions a centrally mixed material, on site. Tim concurred, further stating that blades are not allowed because you can't guaranty a consistency from start to finish.

- Referring to Jim's comment about it being in place for a couple of years, Tim said yes, as a Special Provision. Jim said there use to be a percentage limit on RAP. Tim said it use to be 25 percent RAP, but the issue is actually asphalt cement content so it was changed to the AC content.

Motion: Darrell Giannonatti made a motion to approve Standard Specification 02721 as presented. Seconded Dave Nazare. Passed unanimously.

16. Standard Specification 02741, Hot Mix Asphalt (Agenda Item 16) - Presented by Tim Biel.

Tim said three main areas were changed. The specification took about six months to go through the Pavement Council so there was a lot of input from the Industry. The first set of changes is related to Volumetric Mix Design for a clarification on better use of equipment testing. He said the specification has gone back to a plus or minus for the VMA so it is consistent on both sides of the target as opposed to the offset one. Modifications have been made to require a field target instead of a lab target because there is a significant difference between the two targets. He said they could supply most any lab target as long as they could justify that it is related to the field target.

Discussion points were:

- In response to a comment from Jim on the contractors listed on the submittal sheet, Tim said the contractors are very positive on the changes. He went on to say that no one has had any objections to the changes. The contractors were the ones who initiated the request to go back to a different VMA control because what we had wasn't working very well. Tim said the contractors didn't have a lot of objection to the void content as long as it is well defined.

- Tim said based on the changes it really doesn't effect what we have done over the last five or six years. He said the changes basically makes it easier to make sure we are not arguing about things we were not clear on.

Tim went on to discuss the second part of the change. He said this part is a clarification of mix design and things that have caused some heartburn with Construction in the past. The change tries to be more definitive about what requires a mix design change, how to change it, and how it can be reviewed. Tim said it basically says any changes from now on must be documented up front and acceptance testing by the Department over the previous so many days to justify the change in mix design can be used.

Discussion points were:

- Darrell asked, on unacceptable field designs, what constitutes the definition of a rejected design? Tim said basically it doesn't meet the volumetric requirements. Tim explained the process. He said it is not a conceptual change. We are just defining things a little bit better.

On the area of Dispute Resolution, Tim said the only change was at the request of FHWA. A section was included that allows the Engineer to do a quick check to see if there is an adjustment to the pay factor in a lot that is in dispute. If there is no adjustment, no significant issue about any dispute resolution analysis submitted you can say we are not going to go through the effort of doing this because it is not going to change anything.

Discussion points were:

- Based on comments Tim said to make it simple for everybody the specification says any target change has to be initiated with justification. He said we made it a little bit easier to justify so the Contractors were comfortable with that. On Dispute Resolution, Tim said a lot of time was spent on that part and has been before the Standards Committee in the past.

- In response to a question, Tim said the Pavement Council includes all the Materials Engineers. Tim added that the distribution list includes around 70 people. There are three or four representatives from both sides of industry and testing community. The only people missed are Preconstruction and Design.

- Tim said he has a specification ready to go that they will change order into a project that they feel comfortable with.

- Jim said he was interested in the cost information shown on the submittal sheet. Tim said the only cost that is going to come out of it is if we are trying to push back to the five percent we had. That equates to a much more durable pavement. He said, in actual numbers it adds four or five years to the life of the pavement before you have to come back because the surface cracked or oxidized. Tim said we are actually trying to get it back to meet our design life strategy.

- Darrell provided some background on the design life criteria. Over time the asphalt contents have dropped. Everyone has learned a lot about gradations and how to get a lesser asphalt content. He said the intension always was to get a thicker film thickness and a longer life to match the design life strategy. Tim said that 90 percent of our pavement failures are environmentally related and only 10 percent are structurally related.

- Tim said this specification was something they wanted to get through as quickly as possible with the changes they knew had to be made. He said there are “next generation” changes coming. When they go to the Void Control specification Tim said they would make a complete jump over.

- Jim asked why wouldn’t we want to do this? Tim said there isn’t a reason. There nothing here that provides inferior materials or a hardship on the contractor or the Department. The changes are all positive.

Motion: Tracy Conti made a motion to approve Standard Specification 02741 as presented. Seconded Jason Davis. Passed unanimously.

17. Standard Specification 02744, Hot Mix Asphalt – Procurement for Deletion (Agenda Item 17) - Presented by Tim Biel.

Tim said that the specification is not used so he would like to delete the standard. The specification causes confusion in contracts.

Discussion points were:

- The specification is not the same one that Maintenance uses to procure mix.

Motion: Darrell Giannonatti made a motion to approve the deletion of Standard Specification 02744, Hot Mix Asphalt – Procurement. Seconded Dave Nazare. Passed unanimously.

18. Standard Specification 01574, Dust Control and Soil Stabilizing (Agenda Item 18) - Presented by Lynn Bernhard.

Lynn said he is representing the New Products Evaluation Panel. He said they are proposing a new specification that allows the use of magnesium chloride. Current specifications only allow the use of water for dust control. He said it is not a new product or process but would be new to the specifications. Lynn said one of the features is that there is no percentage of material content for the magnesium chloride in the liquid. He said the dust control specification is to control dust, not the quantity of physical magnesium chloride applied. If the contractor can get the results he wants with a lower or higher percentage, what ever he wants, that is their doing rather than ours. This is an alternative to our existing specification.

Discussion points were:

- In response to a question as to environmental, Lynn said there are environmental issues. That is why the table in article 2.1 shows the limits of other materials. Lynn said that magnesium does not migrate laterally. He said research done in the Pacific Northwest states using magnesium products for snow removal shows it does not migrate beyond the shoulder of the road.

- Darrell said if we call it out for dust control what is the testing procedure we have to go through to get it approved. Lynn said the testing procedure is done outside of the Department. The lab has the capabilities to do the testing but it quite time consuming. Lynn said it usually takes about two weeks for turnaround and costs about $500.

- Betty asked about the use in vegetated areas. Lynn said if you were referring to an attempt to revegetate area where you have applied magnesium chloride you would have to do it with salt tolerant species. Lynn said revegatated areas usually have topsoil put back on.

- Jason said that on the submittal sheet it appeared that no one from the Environmental area was contacted. Lynn agreed and said he would be happy to do that. Lynn said they currently use magnesium chloride to stabilize gravel roads and that he had already done coordination with Environmental on that. He said he therefore chose not to do it on this one because he thought he understood what the concerns were.

- Jim said it was interesting to him that normally dilution rates are specified when maintenance buys the product. Lynn said that was true but because of ice control and they buy it on the same contract. With respect to dust control, Jim asked, do you then use the same percentage. Lynn said they did. It is simpler that way. Jim said if he understands it properly, in this specification you are suggesting you would leave it up to the contractor as to the concentration as long as it controls dust. Lynn said the contractor has to control dust to the satisfaction of the Engineer. The contractor can use whatever solution they want. Jim said this specification says we are allowing the use of magnesium chloride rather that specifying it. Lynn agreed.

- Barry Sharp said one thing not addressed is the effectiveness. He said it may work great and last forever and ever.

- Jim asked the Committee if this specification is useful right now. One comment indicated more work was needed. Another comment indicated a special provision would be used by change order this summer. Darrell said one concern was an environmental one. Is there any necessity to have the Environmental Section review the specification? Jim said it seems to him that Lynn has a significant amount of work to do to bring it back next time. Jim said that might be the last shot before the construction season starts.

- Jim said Tracy just made a comment that realistically a special provision is needed any time magnesium chloride is used because the cost is so different. Jim said it seems that it would be hard to have a specification that handles both water and magnesium chloride. Lynn said that is why they wrote the separate specification.

- The specification will be brought back.

Action Item: Lynn to update submittal sheet and specification based on current discussion.

19. Review of Assignment/Action Log (Agenda Item 19)

Discussion points were:

- Item 1, 800 Series drawings: The process continues. The drawings will be brought back to the next meeting.

- Item 2, 09972 (Painting for Structural Steel), 09991 (Cleaning and Repainting Structural Steel), and 09992 (Cleaning and Overcoating Structural Steel): The process will be completed as discussed in Agenda Item 10 and brought back for the August 2003 meeting. Structures to send letter to paint contractors.

- Item 3a, Incentive payments for smoothness, 01452 (Profilograph and Smoothness): The item is still on track.

- Item 3b, Standard Specification 01452 (Profilograph and Smoothness): Darrell said they are currently using a Special Provision for Zero Blanking Band and that they hope it will be ready for the end of the construction season.

- Item 4, 02962 (In-Place Code Recycled Asphaltic Base): There was no status update.

- Item 5, Pedestrian Access, Detectable Warning: Completed in Agenda Item 13. Closed.

- Item 6, Rumble Strips: No new information. Target date still April 2003 meeting.

- Item 7, 02762 (Plowable Pavement Markers): Bob said that it would be ready for the April 2003 meeting.

- Item 8, 00727 (Control of Work): Darrell said the target date is April 2003.

- Item 9, Black Paint issue: Bob said the target date is April 2003.

- Item 10, Standards Committee suspense dates: Closed.

- Item 11, Numbering system and specification format: Farrell said everyone seems to be in favor of staying with the current system. Another update will be provided at the next meeting. Farrell said they would try to post something on the web.

- Item 12, Design-Build Specification: Target date to be April 2003.

- Item 13, 00725 (Scope of Work): Farrell said that Construction was going to discuss an item with the AGC.

- Item 14, 01284 (Prompt Payment): The item was postponed this month. The item will be shown as open with no date. Construction will advise the Standards Section on progress.

- Item 15, 02705 (Pavement Sawing): Item discussed in Agenda Item 4 and will be brought back to the next meeting.

- Item 16, 02222 (Site Demolition - Pavement), 02223 (Dispose of Asphalt Pavement), and 02316 (Roadway Excavation): Closed in Agenda Item 5.

- Item 17, Painted Cattle Guard: No status.

Jim asked Barry about notifications of the action items. Barry said a copy of the action log was sent out about a week or so before the suspense as well as a proposed agenda.

20. Meeting Improvements (on-going agenda item) (Agenda Item 20)

- None

21. Other Business: Farrell handed out an item on various lump sum measurement and payment items. On Mobilization, Farrell said it is paid up at 20 percent of the contract. He said the handout shows a comparison with the 1979 Spec Book where a certain amount was paid through the whole project. He covered each of the items in the package and the recommendations. Farrell said Larry Buss in Construction provided the recommendation for 01315, Public Information Services shown on page 3 of the handout. The AGC had come to the Department and said these are some of the items that are more intensive up front and that they would like some front load payments to compensate for that. Mont said one of the contractor complaints is that if you have a job that is done, yet you haven't gotten the final estimate why shouldn't you be paid for things like Traffic Control 100 percent at completion of the work. The two options in the handout were discussed. Darrell asked for all the items, can we not take the 25 - 30 percent of the first estimate payment and spread the rest out as percent of project complete. Jim said maybe we could get a consensus from the Construction Engineers. Darrell said he would take the assignment and would get back with a percent. Recapping, Farrell said, line one in the tables would be 25 percent of the bid amount with first estimate. The second line would be, remaining portion to be paid as a percent of contract complete. Mont said he wouldn't do a percentage complete on the Surveying item. Darrell said that the table for Survey would show percent of project complete except the final payment where we will retain five percent of the bid amount until we get the as-built drawings. Farrell said he would update the tables based on the discussion and send them to Darrell for review. Barry asked if this should be put on the agenda and action log for next time or will it be done in the interim. The answer was yes. Farrell said the tables would be modified and hopefully sent out next week some time, along with the bid item updates from the rest of the meeting.

Jason said he would like to get with Farrell and Barry to discuss the submittal sheet and then issue something from the Standards Committee on how the submittal sheet is to be used and what to include or not include on the sheet. There was concurrence.

Action Item: Farrell to update tables, coordinate with Darrell, and publish updates.

Adjourned.

The next regular meeting of the Standards Committee has been scheduled for Thursday, April 24, 2003, at 8:00 a.m., in the 1st floor conference room of the Rampton Complex.

Approval of Minutes: The foregoing minutes were approved at a meeting of the Standards Committee held _____, 2003.

Assignment/Action Item Log (Updated February 27, 2003)

Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
June 27, 2002	1	Team to review Series 800 Standards prior to presentation to the Standards Committee	Research, Safety, Farrell, Clair, and Jason	Open	April 2003 meeting
August 29, 2002		Drawings that were not deleted to be looked at for modification and consolidation. Notes from deleted drawings to be considered for inclusion in remaining drawings or elsewhere.	Robert and Jason		
		Structures to look at 815-7 (Structure Geometrics Design Standards) and 815-8 (Railroad Clearance at Highway Overpass Structures).	Dave and Boyd		
October 31, 2002		Drawings to be completed for the December 19 meeting.			
December 19, 2002 February 27, 2003		Drawings still being worked. Task group to coordinate and update the drawings as required.	John Leonard		
June 27, 2002 October 31, 2002	2	Review 09972 (Painting for Structural Steel), 09991 (Cleaning and Repainting Structural Steel), and 09992 (Cleaning and Overcoating Structural Steel) to clean up the specifications.	Structures	Open	August 2003 meeting
December 19, 2002		Structures reviewing with Materials for proposed changes.	Boyd Wheeler Bill Lawrence		
February 27, 2003		The item will be shown with an August 2003 date. Structures to send letter to paint contractors.	Boyd Wheeler		

Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
June 27, 2002 October 31, 2002 December 19, 2002 February 27, 2003	3a	Incentive payment for smoothness should be looked at. Standard Specification 01452 (Profilograph and Smoothness). Materials working updating the specification based on special provision inputs. Still on track	Darrell and Howard Howard Anderson	Open	April 2003 meeting for special provision inputs.
December 19, 2002 February 27, 2003	3b	Standard Specification 01452 (Profilograph and Smoothness) Materials working on updating specification for Zero Blanking Band and related information.	Howard Anderson	Open	End of Construction Season
June 27, 2002 October 31, 2002 December 19, 2002 February 27, 2003	4	Review specification so that all the issues are addressed. Standard Specification 02962 (In-Place Code Recycled Asphaltic Base). Still in-progress	Darrell, Tim, and Howard Tim Biel, Howard Anderson, Larry Gay	Open	April 2003 meeting
June 27, 2002 October 31, 2002 December 19, 2002 February 27, 2003	5	Standard Drawing PV 8 (Rumble Strip) Process being reviewed. Research looking into testing. A policy is to be developed over the next several months.	Darrell to assign someone from Construction. Richard Miller from Maintenance. Fred Doehring. Betty Purdie. Robert Hull to head the group. Robert Hull Stan Burns Robert Hull Stan Burns	Open	April 2003 meeting

Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
August 29, 2002	6	02762 (Plowable Pavement Markers) to the Traffic Engineering Panel and make any recommended changes to the Standard Specification and Drawing.	Robert	Open	April 2003 meeting
		Research continue looking for better and more improved devices.	Research		
October 31, 2002		Follow up with the TEP and present recommendation.	Robert		
December 19, 2002		TEP having task group review and report by January.	Robert		
February 27, 2003		No change			
August 29, 2002	7	00727 (Control of Work), wording of 1.6B & C (Contractor Cooperation) and 1.8 (Cooperation Between Contractors).	Hugh	Open	April 2003 meeting
December 19, 2002		Construction working with AGC on inputs	Hugh, Mont		
February 27, 2003		Update target date.	Darrell		
Revisited from October 2001 and December 2001 Standards Meetings	8	Black Paint issue on lane striping. Review by Traffic Engineering Panel	Robert	Open	April 2003 meeting
October 31, 2002		Item to the Traffic Engineering Panel.	Robert		
December 19, 2002		Traffic Engineering Panel and Task Group working on issue.	Robert		
February 27, 2003		Update target date.	Robert		

Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
October 31, 2002 December 19, 2002 February 27, 2003	9	The numbering system for specifications to be looked at as well as format. Questionnaire in the general packets for Engineering Conference. Standards to put together an on-line survey to gather more information on Standard Specification format and numbering and Measurement & Payment Document issues	Farrell Wright Farrell Wright Barry Axelrod	Open	April 2003 meeting
October 31, 2002 December 19, 2002 February 27, 2003	10	Design-Build specifications to be looked at by the Innovation Contraction section (Robert Dyer). Reconsider the need for all specifications to be included in the project books. Specifications still being reviewed. Target date to be set. Target date set.	Robert Dyer Robert Dyer Jim McMinimee Robert Dyer	Open	April 2003 meeting
October 31, 2002 December 19, 2002	11	00725 (Scope of Work). Construction to discuss wording with AGC and Region Engineers Obtain inputs from Construction Engineers	Darrell Giannonatti Darrell Giannonatti	Open	April 2003 meeting
December 19, 2002 February 27, 2003	12	01284 (Prompt Payment) discussion delayed for further review by AGC.	Chuck Larson	Open	None

Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
December 19, 2002 February 27, 2003	13	Contractor inputs on the process and present the recommendations for 02222 (Site Demolition - Pavement) and 02705 (Pavement Saving) Item back for further review and update based on meeting comments and recommendations. Standards to determine how to handle a section title change.	Ed Rock Ed Rock Standards	Open	April 2003 meeting
December 19, 2003 February 27, 2003	14	Painted Cattle Guard: With assistance from Research Division, Traffic and Safety to make recommendation. No status.	Glenn Schulte John Leonard	Open	April 2003 meeting
February 27, 2003	15	Standard Drawing GW 10 (Delineation Hardware). Research to look into the use of delineators and the impact on traffic. Research also to look into standards common to rural states in relation to the MUTCD. Coordinate changes within the Maintenance Division.	Research Sterling Davis	Open	April 2003 meeting
February 27, 2003	16	Standards Committee Policy 08A5-1, Submittal Sheet Update. Submittal Sheet to be updated with the addition of Preconstruction and Programming Costs.	Standards	Open	April 2003 meeting
February 27, 2003	17	Standard Specification 01574, Dust Control and Soil Stabilizing. Update based on current discussion.	Lynn Bernhard Barry Sharp	Open	April 2003 meeting

Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
February 27, 2003	18	Lump Sum bid item tables. Farrell to update tables, coordinate with Darrell, and publish updates.	Farrell Wright	Open	Complete
February 27, 2003	19	Standard Specification 00555, Prosecution and Progress. Postponed. Present at next meeting	Jeff Saddler Bob Dyer Larry Myers	Open	April 2003 meeting

Closed Items From Last Meeting (February 27, 2003)					
Date Initiated/Updated	Item #	Action	Assignments	Status	Target Date
June 27, 2002	5	Pedestrian Access, Detectable Warning (Truncated Domes) Bring item to the next Standards Committee meeting.	Traffic and Safety, Rich Clarke	Closed	Closed
August 29, 2002		Traffic and Safety with team develop a specification to go with Standard Drawing GW 5 (Pedestrian Access). Bring drawing and specification to next meeting.	Robert Larry Montoya		
October 31, 2002		Prepare specification for approval at the next meeting.	Larry Montoya		
December 19, 2002		Testing to continue. Drawing to be updated.	Larry Montoya Farrell Wright		
February 27, 2003		Standard Drawing GW 5 (Pedestrian Access) approved			
October 31, 2002	10	Standards Committee suspense dates	Barry	Closed	Information will be sent out after each meeting

December 19, 2002 February 27, 2003	16	Check special provision numbering on 02223, Disposal of Asphalt Pavement. Bring back for approval: 02222 (Site Demolition - Pavement), 02223 (Dispose of Asphalt Pavement), and 02316 (Roadway Excavation) Standard Specifications approved.	Farrell Wright Ed Rock	Closed	Closed

Standards Committee Agenda Items Section

Submittal Sheets, Standard Specification Drafts, Standard Drawing Drafts, and other supporting data for the April 24, 2003 Standards Committee meeting follows.

Standard Committee Submittal Sheet
(Proposal #1 – No Separate Payment for Saw Cutting)

Name of preparer: Ed Rock

Title/Position of preparer: Design Squad Leader/Engineer Manager I

Specification/Drawing/Item Title: 02705 – Pavement Sawing

Specification/Drawing Number: 02705

Date Process Started: December 2002 Date Process Completed:

Status: ☐ Approved ☐ Disapproved ☐ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest.

I recommend paying for saw cutting as part of the removal item. We have been doing this routinely in Region Two for some time via special provision. It simplifies our workload and saves us time in design. It does the same for construction and prevents arguments with the contractor about "average depth". I have not heard any negative feedback from our contractors on any of our jobs. Here are some specifics about why it should be changed.

- First, consider bid item "Asphalt Pavement Sawing" (saw cutting for removal of asphalt pavement). Currently, there are two ways of paying for saw cutting, by the inch-foot and by the foot. For either case our current Measurement and Payment document says "If the average depth exceeds the plan depth by 2 inches or more, the unit price will increase by 20 percent." If we actually think that we can give the contractor an accurate plan quantity showing asphalt pavement thickness accurate to the nearest 2 inches, we are fooling ourselves. Asphalt pavement depth varies WIDELY. In fact, on an urban job, the pavement thickness for the roadway can vary as much as 12 inches. Even more confusing is the change in thickness as you go from centerline to the edge of the existing asphalt. Pavement thicknesses near centerline tend to be thicker because it has commonly been in place for years and been overlaid multiple times. Pavement thicknesses near the edge of pavement tend to be thinner because developers have commonly installed the pavement. What about change in thickness where utility companies have trenched? How do we estimate the thickness of every asphalt driveway or parking lot? My point is this: trying to estimate an accurate existing asphalt thickness is a futile attempt at best. Callouts for asphalt pavement sawing can take up a good portion of plan sheets. Why should we make designers spend hours calling out, estimating, and detailing asphalt pavement sawing for quantities that we know are wrong?

- In addition to being difficult and time consuming for design, measuring and documenting asphalt pavement sawing is a hassle for construction field crews. With increased workload and smaller crews, construction is too busy to spend time documenting pavement sawing and fighting with the contractor about "average depth." Paying for pavement sawing as part of the removal item will help field crews make better use of their time.

- Second, consider the bid item "Concrete Sawing" (saw cutting for removal of concrete items like curb & gutter, sidewalk, driveways, waterways, etc.). Many of the same arguments that were made for "Asphalt Pavement Sawing" can be made for "Concrete Sawing." Estimating a quantity for this item is extremely time consuming for designers. Again, it is a hassle for field crews to measure and document saw cutting. Why not just make things easier for everyone and pay for it as part of the removal of the item?

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

Modify Section 02705 (Pavement Sawing) by inserting a paragraph (1.3) stating that that this item is paid under other items of work.

Is Not Paying for Saw Cutting Unfair to the Contractor?

There will undoubtedly be some resistance from contractors if saw cutting is not paid for separately. Arguments will be made that by not paying separately, this places more responsibility and possibly risk on the contractor (see my comments later in this document under "Contractor" support). Although this may be true to some extent, I believe that these concerns are greatly exaggerated based on the following argument.

There are many pay items used by UDOT that include multiple items of work that put **much more** risk on the contractor, and yet these items are commonly accepted without any reservation because it simplifies the measurement and payment process. Here are a few examples:

- **Pipe**: Payment for pipe includes excavation, pipe, pipe connections, backfill, & compaction. This encompasses much more risk than saw cutting because trench excavation depth can vary, shoring requirements can vary, number of pipe connections can vary, and effort to backfill and compact the trench can vary depending of the native material.
- **Concrete Pavement**: Payment includes dowel bars, curing compound, joint sealing, tining, and even saw cutting.
- **Remove Building, Basement, & Foundation**: Payment includes "any remaining out-buildings and incidental obstructions."
- **Clear and Grub**: This is a pretty open-ended bid item, certainly much more risky to the contractor and difficult to estimate than saw cutting for removal items.

- **Lump Sum Signal and/or Lighting Systems**: Payment for this item includes "all materials and workmanship to provide a complete and fully operational signal system." This is a major bid item in our plans and unquestionably puts more risk on the contractor than does saw cutting.
- **Traffic Control**: Payment includes everything from traffic control devices to flaggers.
- **Roadway Excavation/Embankment**: Technically, no payment is made for embankment. Embankment is paid for as either roadway excavation or borrow. For projects that do not require borrow, this means that the contractor has to determine from the plans how to bid the cost of moving that excavated material around the job site and compacting it.

If UDOT has had no resistance paying for multiple items of work under one pay items for these items (most of which are major bid items requiring the contractor to make assumptions far more complex than saw cutting), why should saw cutting be treated any differently, especially when it is traditionally such a minor bid item?

Historical data shows that saw cutting is, in fact, normally a **very minor** bid item.

To prove this point, data was collected from the UDOT bid system for all awarded contracts since 1990. A total of approximately 230 projects since 1990 included a standard pay item for saw cutting. Of this total, a representative sample of 28 projects was analyzed to compare total project cost to the cost of saw cutting.

Results are shown in Figures 1 & 2. This analysis shows that on average, saw cutting is only ½ percent of the total project cost or only $12,000 per project. For large projects, the unit cost for saw cutting is often $0.01, further emphasizing the insignificant nature of saw cutting.

Bottom line: Is simply does not make sense to spend so much time in design and construction planning and documenting saw cutting details given the incidental nature of saw cutting in the overall construction process.

Figure 1
Pavement Sawing Cost Breakdown

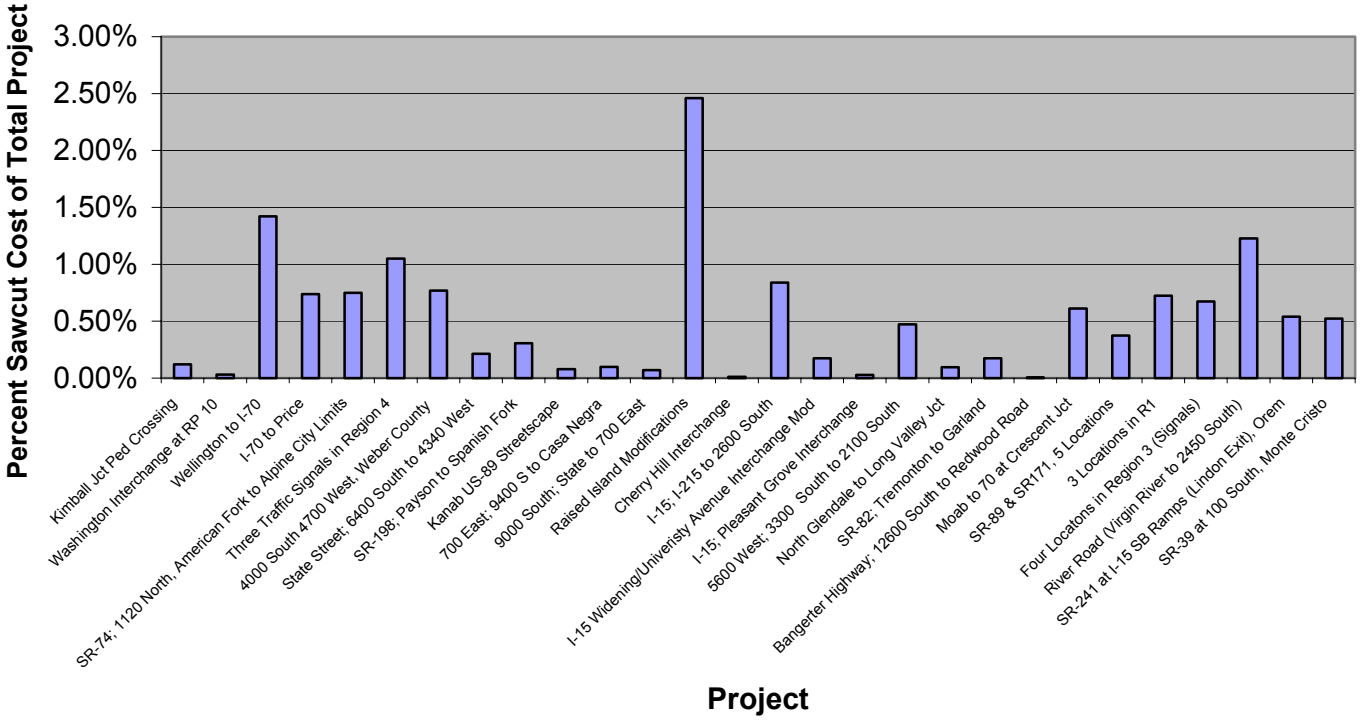


FIGURE 2 - Project Cost Versus Saw Cutting Cost

		Project	Pavement Sawing			
Project Description	Project Number	Cost	Quantity	Unit Cost	Cost	Percent of Total Project Cost
Kimball Jct Ped Crossing	*ISTP-80-4(87)144	$ 1,183,190	144,100	$ 0.01	$ 1,441	0.12%
Washington Interchange at RP 10	*SP-15-1(13)10	$ 9,803,000	158,000	$ 0.02	$ 3,160	0.03%
Wellington to I-70	SP-0006(31(253	$ 1,087,000	772,500	$ 0.02	$ 15,450	1.42%
I-70 to Price	SP-0010(9)0	$ 2,288,000	844,515	$ 0.02	$ 16,890	0.74%
SR-74; 1120 North, American Fork to Alpine City Limits	SP-0074(1)2	$ 2,506,728	940,000	$ 0.02	$ 18,800	0.75%
Three Traffic Signals in Region 4	SP-9999(546)	$ 399,432	60,000	$ 0.07	$ 4,200	1.05%
4000 South 4700 West, Weber County	STP-0037(1)10	$ 187,185	144,000	$ 0.01	$ 1,440	0.77%
State Street; 6400 South to 4340 West	STP-0089(38)318	$ 2,228,206	239,100	$ 0.02	$ 4,782	0.21%
SR-198; Payson to Spanish Fork	STP-0198(1)166	$ 3,763,092	1,147,200	$ 0.01	$ 11,472	0.30%
Kanab US-89 Streetscape	STP-0089(52)62	$ 338,000	75	$ 3.50	$ 263	0.08%
700 East; 9400 S to Casa Negra	*STP-0071(1)7	$ 6,689,451	33,250	$ 0.20	$ 6,650	0.10%
9000 South; State to 700 East	SP-0209(3)8	$ 3,261,546	22,665	$ 0.10	$ 2,267	0.07%
Raised Island Modifications	SP-9999(418)	$ 107,928	16,600	$ 0.16	$ 2,656	2.46%
Cherry Hill Interchange	*HDP-9124(003)	$ 17,400,000	42,000	$ 0.05	$ 2,100	0.01%
I-15; I-215 to 2600 South	*IM-INH-15-7(193)316	$ 15,000,000	3,145,000	$ 0.04	$ 125,800	0.84%
I-15 Widening/Univeristy Avenue Interchange Mod	*NH-HPP-15-6(135)266	$ 26,000,000	2,260,000	$ 0.02	$ 45,200	0.17%
I-15; Pleasant Grove Interchange	*SP-15-6(32)276	$ 10,900,000	299,870	$ 0.01	$ 2,999	0.03%
5600 West; 3300 South to 2100 South	HPP-0172(2)3	$ 3,587,679	1,696,600	$ 0.01	$ 16,966	0.47%
North Glendale to Long Valley Jct	NH-STP-0089(11)90	$ 5,120,000	244,000	$ 0.02	$ 4,880	0.10%
SR-82; Tremonton to Garland	SP-0082(1)0	$ 2,009,027	348,000	$ 0.01	$ 3,480	0.17%
Bangerter Highway; 12600 South to Redwood Road	SP-0154(9)1	$ 31,869,866	69,000	$ 0.02	$ 1,380	0.00%
Moab to 70 at Crescent Jct	SP-0191(25)125	$ 2,363,000	1,450,000	$ 0.01	$ 14,500	0.61%
SR-89 & SR171, 5 Locations	SP-9999(409)	$ 399,290	24,850	$ 0.06	$ 1,491	0.37%
3 Locations in R1	SP-9999(411)	$ 533,000	48,300	$ 0.08	$ 3,864	0.72%
Four Locatons in Region 3 (Signals)	SP-9999(531)	$ 646,000	217,600	$ 0.02	$ 4,352	0.67%
River Road (Virgin River to 2450 South)	STP-3196(1)0	$ 1,229,229	502,500	$ 0.03	$ 15,075	1.23%
SR-241 at I-15 SB Ramps (Lindon Exit), Orem	SP-0241(1)1	$ 262,000	14,120	$ 0.10	$ 1,412	0.54%
SR-39 at 100 South, Monte Cristo	STP-0039(8)19	$ 231,000	15,100	$ 0.08	$ 1,208	0.52%
AVERAGE		***$ 5,406,887***			***$ 11,935***	***0.52%***

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

In-house (for example, materials, construction, safety, design, maintenance) (Include all applicable in-house areas)

1. **Betty Purdie** (Region Two Preconstruction Engineer, former Resident Engineer Region Two): Contacted in person. She is in favor of making the change.
2. **Craig Hancock** (Design Squad Leader Region 3): Contacted by phone. He is also in favor of the change.
3. **Steve Ogden** (Design Squad Leader Region 4): Contacted by phone. He thinks the change is a good idea but wanted to make it clear that this is only his personal opinion, and that he has not officially spoken with Region Four Construction to get their input. He also has some concerns about how to pay for changed conditions if the existing asphalt is thicker than shown in the plans. The current specification does provide an easy way to handle this problem.
4. **Steve Niebergall** (Roadway Design Region 1): Contacted in person. He is in favor of the change.

Construction Engineers

1. **Brandon Squire** (Resident Engineer – Region Two): Contacted in person. He is in favor of making the change. He commonly requests that sawing be paid under part of the removal item on his projects. He has not heard any negative feedback from contractors on his jobs.
3. **Kris Peterson** (Resident Engineer – Region Two): Contacted in person. He is also in favor of making the change. Kris also asks design to create a special provision on his projects paying for saw cutting as part of the removal item. It saves his crew time and prevents arguments with the contractor. I asked Kris is he has heard any negative feedback from the contractor on his projects that do not pay for saw cutting separately. He told me he has not heard any negative feedback, including on his 10600 South project with Meadow Valley.
3. **Brett Hadley** (Resident Engineer – Region Two) & **Mark Allington** (Level 4 Construction Inspector on Brett Hadley's Crew): Contacted in person. Both Brett & Mark are in favor of this proposal. In fact, they told me that this change would have saved them from several expensive change orders on their 5600 West project. They also complained that the current removal specification is not clear because it says that saw cutting is required but doesn't clarify how saw cutting is paid.
4. **Tim Rose**: I sent the proposed specification to Tim for review. He supports the change.

5. **Region Four Construction (Karl Verhaeren, Rex Friant, Fred**

Jenkins, Jim McConnell): I sent this proposal to Karl who forwarded it to several other people in Region Four. Karl, Fred, and Jim support the proposed action. Rex prefers to have saw cutting paid separately.

6. **Bob Westover:** Here are Bob's comments: "I don't have any problem with the spec that you are proposing. I support simplification. I thought that I recalled that we committed to give the AGC a heads up on any changes that we make to the standards so that they all can evaluate the changes as they are bidding. You might check with McMinimee to verify my memory and determine how that notification happens."

Contractors

Betty Purdie contacted Kip Wadsworth (President of AGC) and asked him to provide feedback on this issue.

Kip discussed this item with his constituents and reported back some mixed feelings regarding the idea of paying for saw cutting as part of the removal item. Even though Kip agreed that saw cutting is usually a very minor bid item, most of his constituents were opposed to the idea because they feel it is adding to the trend by UDOT of putting more risk and responsibility on the contractor, similar to what UDOT has done with lump sum traffic control.

Betty suggested to Kip that UDOT was looking into fixing some of the major lump sum bid items, like traffic control that put a lot of risk on the contractor by paying separately for temporary barrier, early warners, etc. She asked Kip if the AGC would be willing to accept paying for saw cutting as part of the removal item (a minor bid item) if UDOT were to fix some of the more risky lump sum items. Kip agreed that was a possibility.

Suppliers: Not Applicable

Consultants (as required): Not Applicable

Others (as appropriate)

D. Costs? (Estimates are acceptable.)

1. Additional costs to average bid item price
Minimal. It *may* increase the unit cost for the removal items by a few cents. However, we have not noticed any significant difference in cost in Region Two.

2. Operational (For example, maintenance, materials, equipment, labor,

administrative).
Less time for design crews and construction field crews. It should save us time and money.

3. Life cycle cost
Not applicable

E. Safety Impacts?
Not applicable.

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

As previously mentioned, we have paid for pavement sawing as part of the removal item of several of our projects, including: Cherry Hill Interchange (concrete items only), Redwood Road (9000 South to 10400 South), I-80 (Echo to Castle Rock), 10600 South, & East Jordan Canal Replacement (14600 South).

Design likes it, construction crews like it, and we haven't heard the contractors complaining.

Standard Committee Submittal Sheet

(Proposal #2 – Allow the Contractor the Choose the Method of Cutting Asphalt Pavements)

Name of preparer: Ed Rock

Title/Position of preparer: Design Squad Leader/Engineer Manager I

Specification/Drawing/Item Title: 02705 – Pavement Sawing

Specification/Drawing Number: 02705

Date Process Started: February 2003 Date Process Completed:

Status: ☐ Approved ☐ Disapproved ☐ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest.

The request has been made to modify Part 3 (Execution) the specification to allow alternate methods of cutting asphalt pavements other than saw cutting. Although saw cutting is necessary to achieve a straight, vertical cut in concrete surfaces, there are other ways of obtaining a straight, vertical cut in asphalt surfaces without using a saw. In some cases, this has the potential to save the contractor money by not saw cutting. For example, a rotomill can achieve this goal. It is proposed that the specification be changed to require saw cutting on concrete surfaces but to allow the contractor to choose any method that achieves the desired goal of a straight, vertical cut when working with asphalt surfaces.

In addition to the change to Section 2705, two other specifications (02222 – Site Demolition – Concrete, & 13553 – ATMS Conduit) which reference Section 02705 must be modified should the proposed change be accepted.

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

This change has no effect on measurement and payment.

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in-person), concerns, and comments of the change. Stakeholders:

In-house (for example, materials, construction, safety, design,

maintenance) (Include all applicable in-house areas)

1. **Betty Purdie** (Region Two Preconstruction Engineer, former Resident Engineer Region Two): Contacted in person. She is in favor of making the change.
2. **Region Two Construction (Tim Rose, Brandon Squire, Lonnie Marchant, Kris Peterson, Darren Rosenstein, Brett Hadley).** All support the change and are fine with the language in the proposed specification.
3. **Bob Westover**: Bob did not see any problems with the proposed specification.
4. **Region Four Construction (Karl Verhaeren, Rex Friant, Fred Jenkins, Jim McConnell)**: I sent this proposal to Karl who forwarded it to several other people in Region Four. Karl, Fred, and Jim support the proposed action. Based on Jim's comments, I added paragraph 1 under section 3.2,A.

Contractors

This idea was originally suggested during a Standards Committee Meeting earlier this year by Mont Wilson (Granite Construction). Mont felt that a straight, vertical cut can be made in asphalt pavements without requiring a saw cut. He feels that this change is good for the contractor because it has the potential, in some cases, to save money while still providing the Department the desired end result. Right now, this is only allowed if the Resident Engineer allows alternate methods of cutting pavements, which has lead to inconsistencies in the Department based on the particular opinion of the Resident Engineer.

Suppliers: Not Applicable

Consultants (as required): Not Applicable

Others (as appropriate)

D. Costs? (Estimates are acceptable.)

1. Additional costs to average bid item price
   The change has the potential to lower costs under the right conditions with asphalt pavement.

2. Operational (For example, maintenance, materials, equipment, labor, administrative).
   The change could save time by eliminating a step in the construction process.

3. Life cycle cost
   Not applicable

E. Safety Impacts?
   Not applicable.

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

   This idea was brought up during the February Standards meeting while discussing the original modification to the Pavement Sawing specification (changing Part 1 of the Specification to pay for saw cutting as part of removal items). However, rather than changing the specification twice in two months, the suggestion was by the Standards Committee to combine both changes into one proposal. As such, it should be understood that the change stated in this proposal accompanies the original proposal, and does not function as a separate, independent change.

SECTION 02705

PAVEMENT CUTTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Saw or cut pavements, curb and gutter, sidewalk, and/or any appurtenances as required to provide a smooth surface to match.

1.2 RELATED SECTIONS

A. Section 02748: Prime Coat/Tack Coat.

1.3 PAYMENT PROCEDURES

A. Department makes no separate payment for Pavement Sawing. Include in associated bid items.

PART 2 PRODUCTS Not used.

PART 3 EXECUTION

3.1 PROCEDURE – CONCRETE SURFACES

A. Saw cut vertically in a straight line through the full depth of the surface.

B. Where the edge of the existing surface is cracked, broken, or deteriorated, make the cut so the defective surface can be removed.

C. Do not allow traffic or construction equipment to cross the cut edge.

3.2 PROCEDURE – ASPHALT SURFACES

A. Use any method that provides a vertical cut in a straight line through the full depth of the surface.
   1. Should the method of cutting not produce a smooth, non-broken edge, saw cutting will be required at no additional cost to the Department.

B. Where the edge of the existing surface is cracked, broken, or deteriorated, make the cut so the defective surface can be removed.

C. Do not allow traffic or construction equipment to cross the cut edge.

D. When appropriate, apply a tack coat to the cut edge before placing hot mix asphalt surfacing. Refer to Section 02748.

END OF SECTION

Standard Committee Submittal Sheet

Name of preparer: Glenn Schulte
Title/Position of preparer: Transportation Specialist
Specification/Drawing/Item Title: Buried End Terminals & Anchor systems
Specification/Drawing Number: BA 4D, BA 4E, BA 4F
Date Process Started: _____ Date Process Completed: _____
Status: ‘ Approved ‘ Disapproved ‘ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)
Bolded items below were added/updates on April 2, 2003.

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest.

These treatments were developed to eliminate the use of crash cushions in certain situations. Both maintenance personnel and design are looking for alternatives and less costly treatments for guardrail end protection.

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

Two new bid items with the two anchoring options will be established.

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

In-house (for example, **preconstruction**, materials, construction, safety, design, maintenance) **(Include all applicable in-house areas even if not listed above.)**

Construction Engineers

Contractors: none have been contacted, but two contractors have installed versions of these versions of these treatments on UDOT roadways. There were 6 installed on SR-14 and 4 installed on I-80.

Suppliers; none

Consultants (as required)

The Washington State Standard was supplied to Baker Engineering for a project being designed in Emery County.

Others (as appropriate)

The Washington State Standard was supplied to both Region 2 and Region 4 design for projects they designed and constructed.

D. Costs? (Estimates are acceptable.)

Average bid cost for these installations:

Washington State: Buried Terminal $ 515.00 to
Buried Terminal w/Rub Rail 970.00 assuming a 50 section of rub rail

California: Buried Terminal $ 730. 00

Delaware: Buried Terminal, single bid item. Ranging from 16.00 to 23.00 linft.
With a minimum pay item length of 25ft.
Single rail terminal $ 625.00
Double rail terminal $1150.00

1. Additional costs to average bid item price.

Based on the cost estimates obtained using these installations in lieu of a crash cushion the department could save approximately $ 1200.00 plus per installation.

UDOT 2002 Average Bid Price
Type G, Crash Cushion: $2072.00
Type H, Crash Cushion: $2075.00

2. Operational (For example, maintenance, materials, equipment, labor, administrative, **programming**).

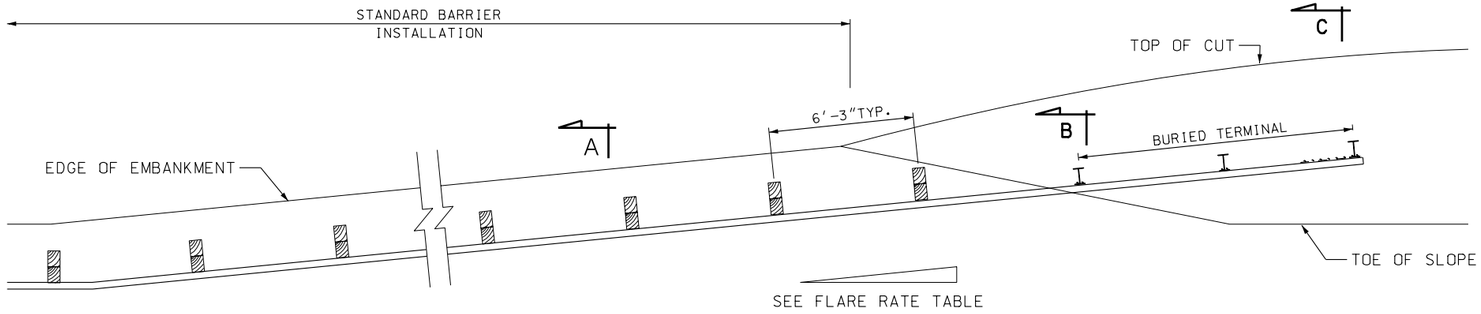
These types of installations have been test and used in several states over the years and found to be very functional in redirecting vehicles away from hazards. There is not an NCHRP test requirement for this system, but it is an installation recommended in the Roadside Side Design Guide (RDG 2002, 8.2.3) as an alternative to using a crash cushion.
Maintenance forces can repair these installations, as they are standard guardrail with no special parts after initial installation.

3. Life cycle cost.

E. Safety Impacts?

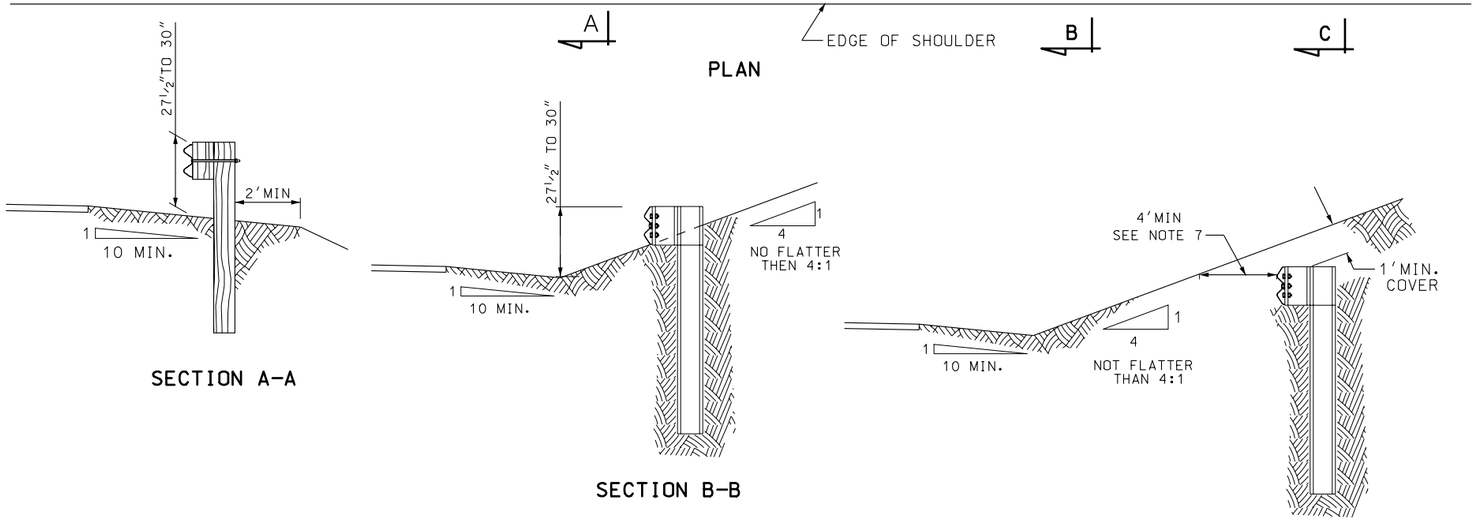
Using these installations will move the barrier systems further from the roadway and eliminate any blunt ends that may occur. Again these installations have proven to redirect an errant vehicle.

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.



PERSPECTIVE

FLARE RATE TABLE	
POSTED SPEED (mph)	RATE
40 OR LESS	9 : 1
45	10 : 1
50	11 : 1
55	12 : 1
60	13 : 1
65	14 : 1
75 AND GREATER	15 : 1

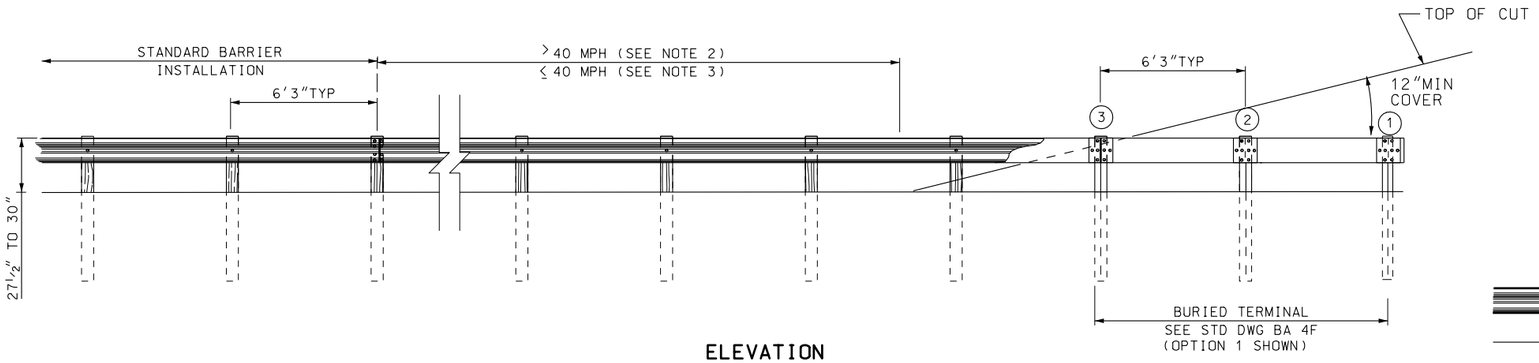


PLAN

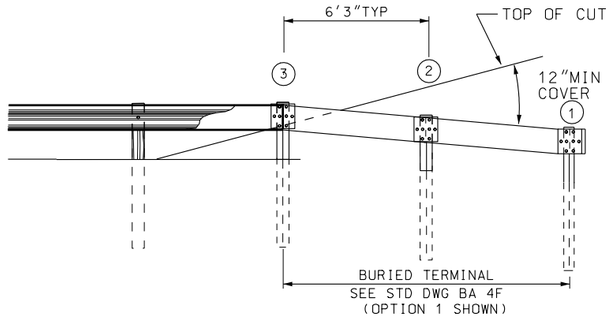
SECTION A-A

SECTION B-B

SECTION C-C



ELEVATION



RAIL ELEMENT CAN BE TAPERED DOWN AT 12:1 FROM POST 3 TO POST 1 IN ORDER TO ACHIVE THE 12 " COVER MATERIAL.

NOTE:

1. PRIOR TO USING THIS DESIGN, CONSULT LOCAL MAINTENANCE PERSONNEL TO ENSURE NO NEED EXIST FOR GETTING BEHIND THE BARRIER INSTALLATION AND THAT DRAINAGE ISSUES ARE ADDRESSED.
2. USE MINIMUM "LENGTH OF NEED REQUIREMENT" FROM CURRENT EDITION OF THE "ROADSIDE DESIGN GUIDE" FROM HAZARD TO TOE OF SLOPE.
3. USE 75 FEET MINIMUM FROM TOE OF SLOPE TO FACE OF HAZARD.
4. REFER TO STD DWG BA 4F FOR BURIED TERMINAL ANCHOR DETAILS.
5. USE PERMITTED ON APPROACH OR TRAILING ENDS OF A W-BEAM BARRIER INSTALLATION.
6. USE IN ESTABLISHED SLOPES. DO NOT BUILD A MOUND TO USE THIS SYSTEM.
7. A MINIMUM 4' EMBEDMENT REQUIRED AT POST 1 FROM THE FACE OF GUARDRAIL PANEL TO THE FACE OF SLOPE.

NO.	DATE	APPR.	REMARKS
1	04/07/03		NEW DRAWING

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — APR.24,2003 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — APR.24,2003 DATE

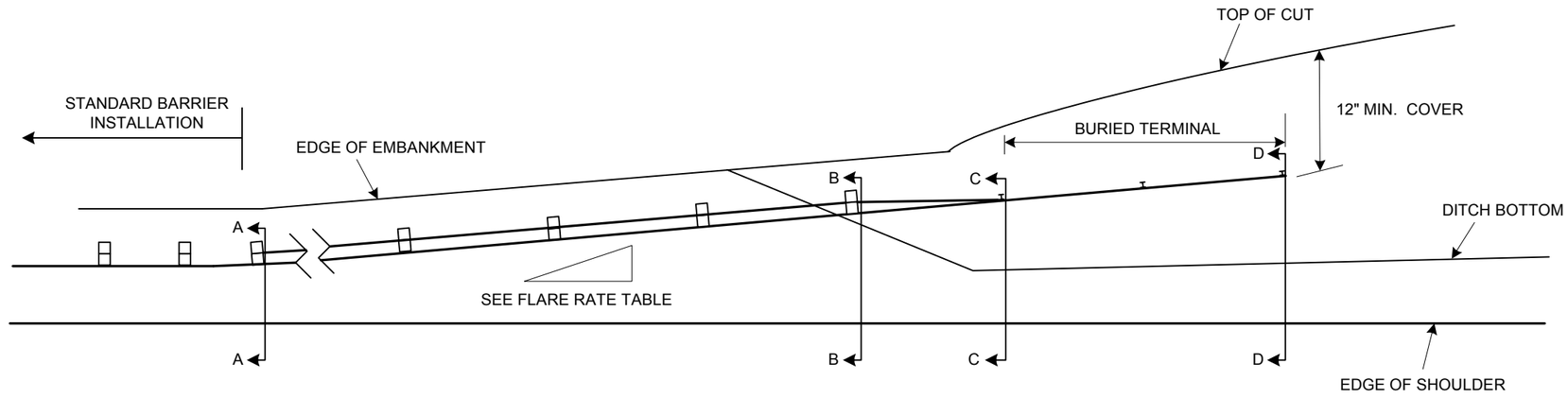
DEPUTY DIRECTOR

STANDARD DRAWING TITLE

BEAM GUARDRAIL SINGLE RAIL BURIED TERMINAL

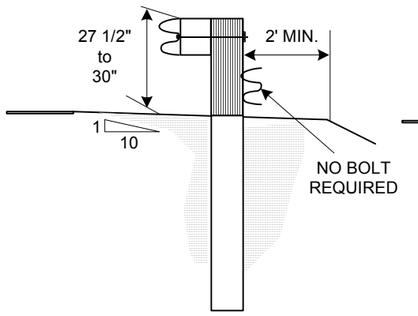
STD DWG
BA 4D

DGN File:N:\Esd\Standard Drawings\Imperial\Working\StandardsCommitteeFiles\BA04D.dgn
09-APR-2003

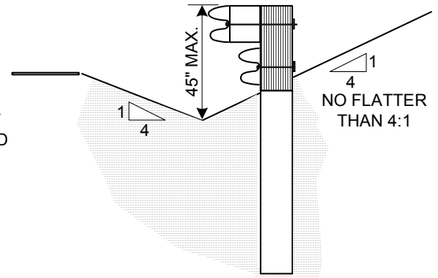


NOTES:

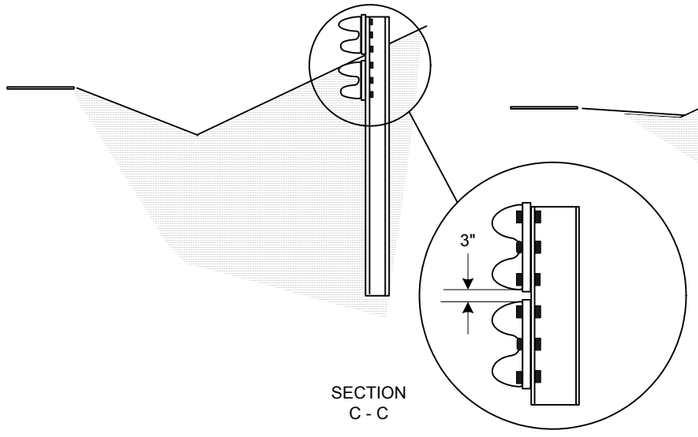
1. PRIOR TO USING THIS DESIGN, CONSULT LOCAL MAINTENANCE PERSONNEL TO ENSURE NO NEED EXIST FOR GETTING BEHIND THE BARRIER INSTALLATION AND THAT DRAINAGE ISSUES ARE ADDRESSED.
2. USE MINIMUM " LENGTH OF NEED " REQUIREMENT FROM CURRENT EDITION OF "ROADSIDE DESIGN GUIDE" FROM TOE OF SLOPE.
3. USE 75 FEET MINIMUM FROM TOE OF SLOPE TO FACE OF HAZARD.
4. REFER TO STD DWG BA 4F FOR BURIED TERMINAL ANCHOR DETAILS.
5. USE 84 " POSTS FOR POSTS WITH W-BEAM RUB RAIL ATTACHED. POST WILL BE MARKED AS PER STD DWG BA 4, NOTE 2.
6. USE PERMITTED ON APPROACH OR TRAILING ENDS OF W-BEAM BARRIER INSTALLATIONS.
7. USE ESTABLISHED SLOPES. DO NOT BUILD A MOUND TO USE THIS SYSTEM.
8. A MINIMUM 7' EMBEDMENT REQUIRED AT POST 1 FROM THE FACE OF GUARDRAIL PANEL TO THE FACE OF SLOPE.



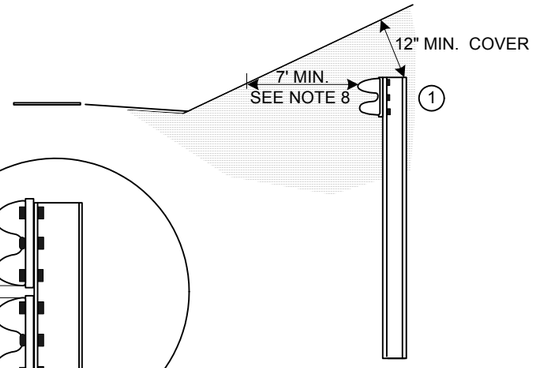
SECTION A - A



SECTION B - B



SECTION C - C



SECTION D - D

FLARE RATE TABLE	
SPEED(MPH)	RATE
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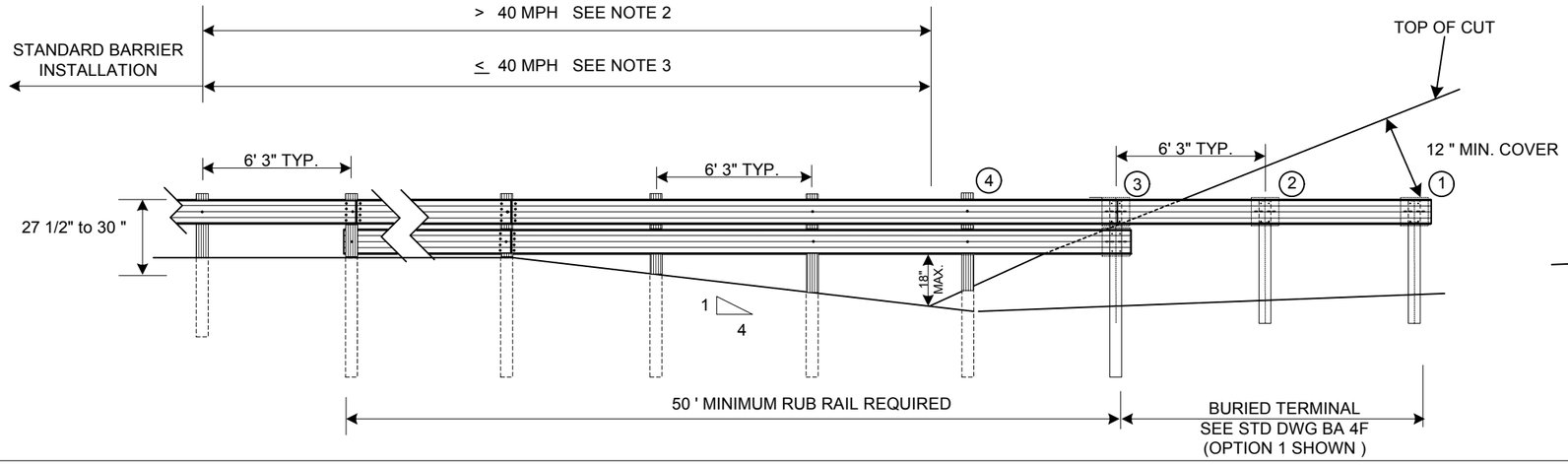
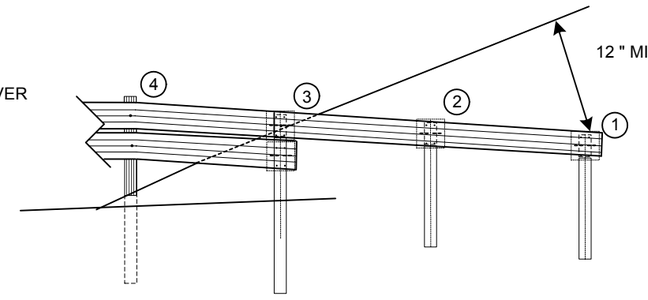
45	10:1
50	11:1
55	12:1
60	13:1
65	14:1
75 AND GREATER	15:1

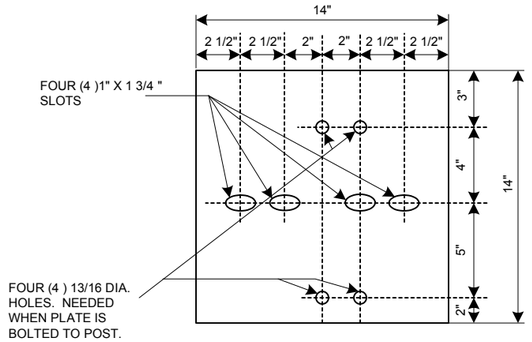




RAIL ELEMENT CAN BE TAPERED DOWN AT 12:1 FROM POST 4 TO POST 1 IN ORDER TO ACHEIVE 12" COVER.

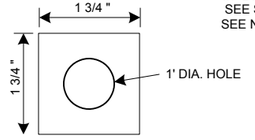
BEAM GUARDRAIL
BURIED TERMINAL
WITH RUB RAIL

BA 4E
DRAFT

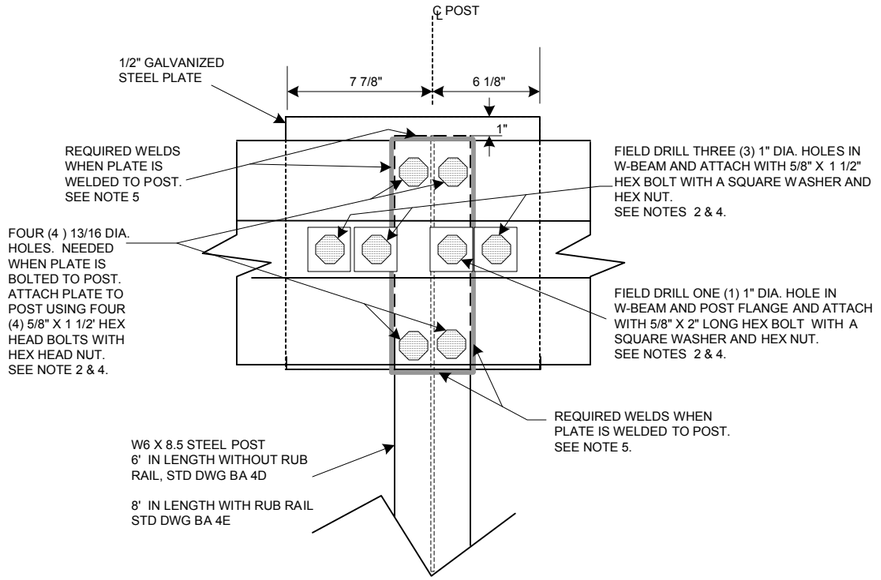


1/2" STEEL PLATE

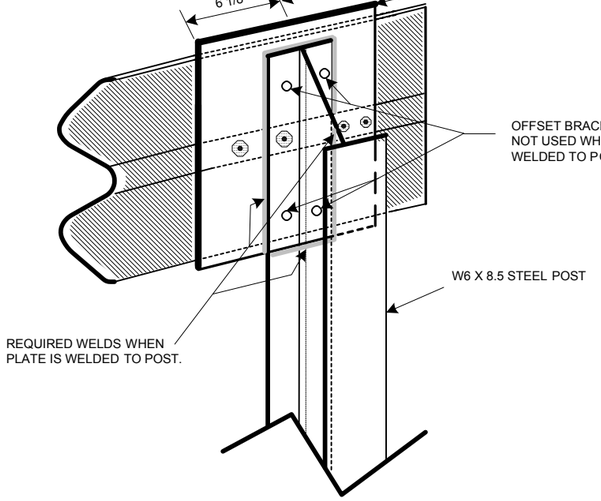
(GALVANIZED)
BOLTED OR WELDED TO POSTS 1, 2, 3 OF BURIED TERMIAL END.
SEE STD. DWRS. BA 4D AND BA 4E
SEE NOTE 1



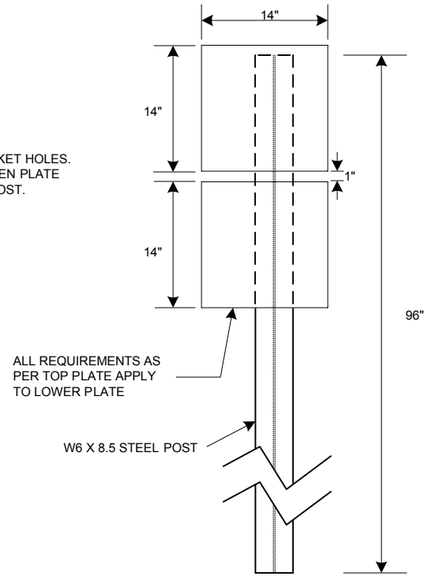
SQUARE WASHER
(3/16 THICK, GALVANIZED)



POST / PLATE ATTACHMENT
FRONT VIEW



POST / PLATE ATTACHMENT
REAR VIEW



POST / PLATE REQUIREMENTS FOR
BURIED TERMINAL WITH RUB RAIL
POST 3, STD DWG BA 4E

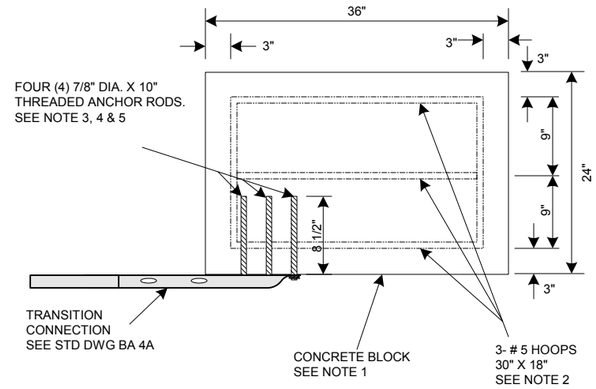
NOTES:

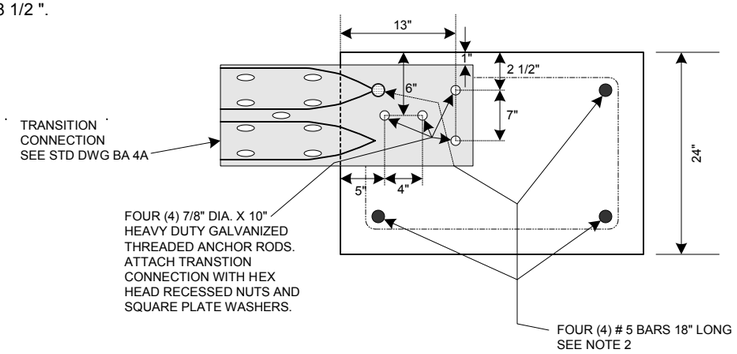
1. USE 1/2' STEEL PLATE MEETING REQUIREMENTS OF A-36.
2. GALVANIZING REQUIRED FOR PLATE AND HARWARE.
3. CONTRACTOR HAS THE OPTION OF BOLTING OR WELDING PLATE TO POST.
4. USE ZINC RICH PAINT TO COAT FIELD DRILLED HOLES.
5. COMPLETE WELDS AT ALL POINTS PLATE COMES INTO CONTACT WITH POST. COAT WELDS WITH ZINC RICH PAINT WHEN WELDED AFTER GALVANIZING.

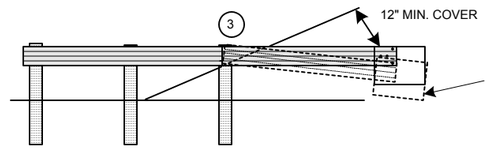
BURIED TERMINAL POST REQUIREMENTS
DETAILS APPLICABLE TO POSTS 1, 2, 3 OF
STD DWG BA 4D AND BA 4E
(OPTION 1)

NOTES:

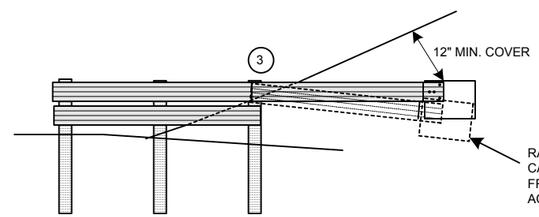
1. USE CONCRETE CONFORMING TO UDOT STANDARD SPECIFICATION SECTION 03055, 3.2 AA(AE).
2. USE COATED REINFORCING STEEL.
3. USE GALVANIZED THREADED ROD CONFORMRING TO AASHTO M-314 GRADE 36.
4. RODS CAN BE CAST INTO CONCRETE BLOCK OR HOLES CAN BE DRILLED INTO BLOCK AFTER CASTING.
5. DRILL 1" HOLES A MINIMUM 9" DEEP. CLEAN DRILLED HOLES PRIOR TO INSERTING TREADED ROD AND ANCHORING EPOXY. ANCHORING EPOXY WILL MEET ASTM 881, TYPE IV, GRADE 3 REQUIREMENTS. MINIMUM ENBEDMENT 8 1/2 ".







STANDARD LAYOUT WHEN USING CONCRETE BLOCK ANCHOR WITH STD DWG BA 4D. POSTS 1 AND 2 ARE ELIMNATED AND POST 3 IS A STANDARD LINE POST USED WITH OUT A BLOCK OUT.



STANDARD LAYOUT WHEN USING CONCRETE BLOCK ANCHOR WITH STD DWG BA 4E. POSTS 1 AND 2 ARE ELIMNATED AND POST 3 IS A 96"LINE POST USED WITH OUT A BLOCK OUT.

BURIED TERMINAL CONCRETE BLOCK ANCHOR
STD DWG BA 4D AND BA 4E
(OPTION 2)

BEAM GUARDRAIL
BURIED TERMINAL
ANCHORS

BA 4F
DRAFT

Standard Committee Submittal Sheet

Name of preparer: Glenn Schulte
Title/Position of preparer: Transportation Specialist
Specification/Drawing/Item Title: Guardrail Installation Details
Specification/Drawing Number: BA 4G, BA 4H, BA 4I, BA 4J, BA 4K, BA 4L
Date Process Started: _____ Date Process Completed: _____
Status: ‘ Approved ‘ Disapproved ‘ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)
Bolded items below were added/updates on April 2, 2003.

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest.

This is a continuing effort to improve UDOT Design and Installation Standards for guardrail barrier systems.

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
NO CHANGE

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

In-house (for example, **preconstruction**, materials, construction, safety, design, maintenance) **(Include all applicable in-house areas even if not listed above.)**

Construction Engineers

Project reviews comments indicate that there is not enough direction as to the proper installation of guardrail barrier systems.

Contractors NONE

Suppliers NONE

Consultants (as required)

Project reviews comments indicate that there is not enough direction as to the proper design of guardrail barrier systems.

Others (as appropriate) Region Designers
Project reviews comments indicate that there is not enough direction as to the proper design of guardrail barrier systems.

D. Costs? (Estimates are acceptable.)

1. Additional costs to average bid item price**. NONE**

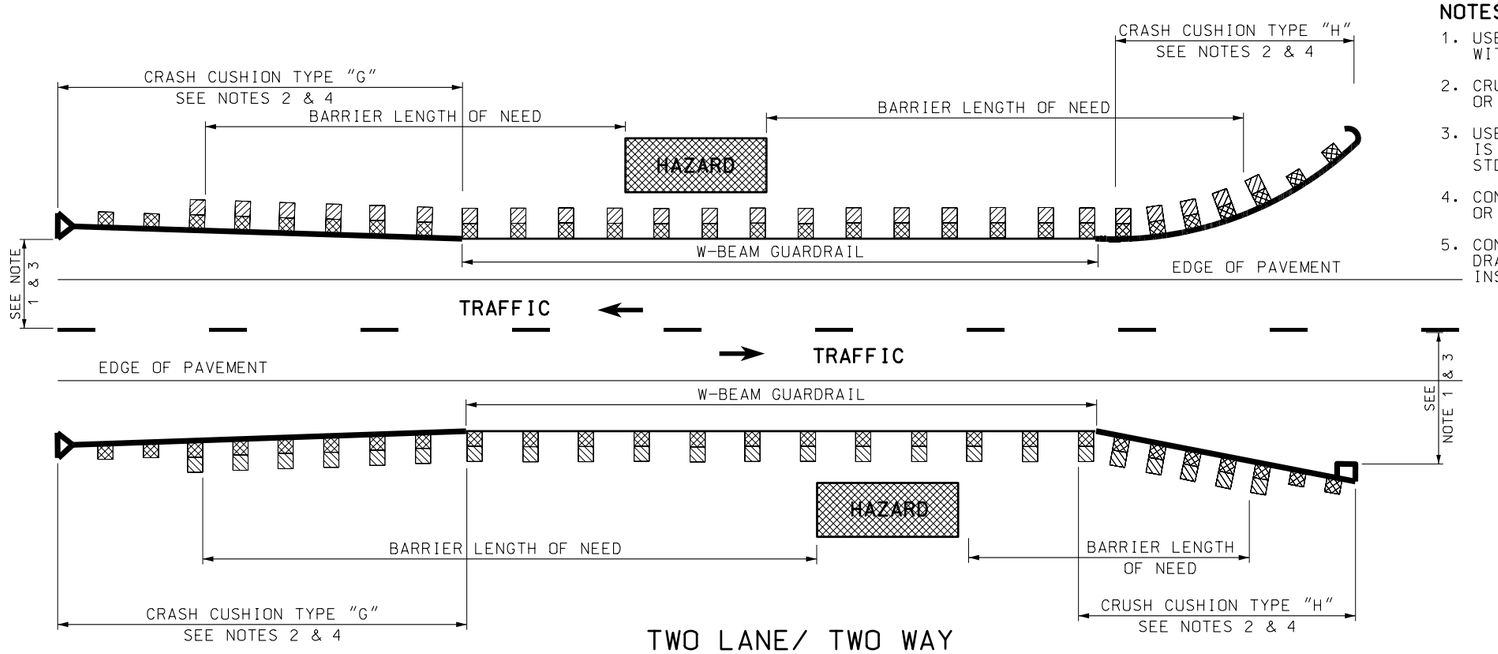
2. Operational (For example, maintenance, materials, equipment, labor, administrative, **programming**).

NO CHANGE

3. Life cycle cost.

E. Safety Impacts?
These applications will give the designer more options and help in installation of this barrier system. All standard meet the accepted practices as required in the Roadside Design Guide for vehicle redirection.

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

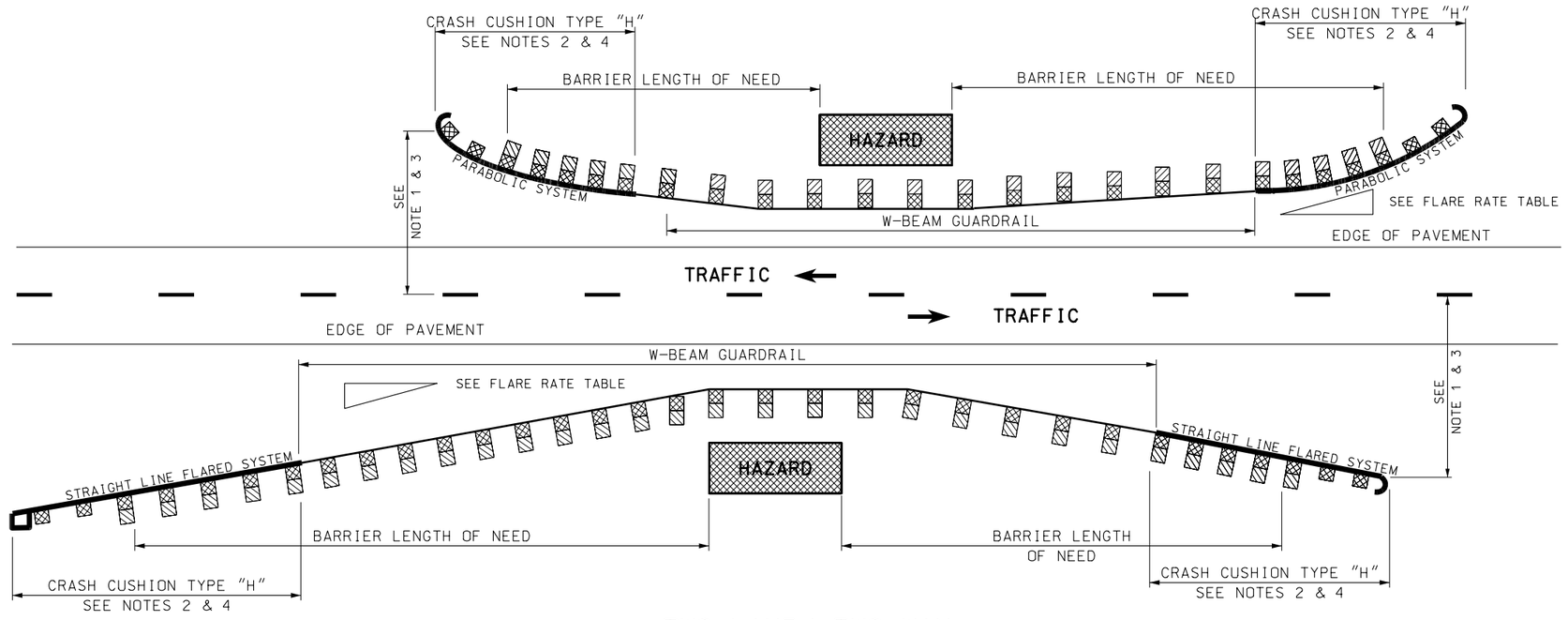


TWO LANE/ TWO WAY
TANGENT GUARDRAIL INSTALLATION
(DETAIL BA 4G-1)

NOTES.

1. USE CRASH CUSHION WHEN END OF GUARDRAIL INSTALLATION IS WITHIN 1.2 TIMES THE AASHTO REQUIRED CLEAR ZONE .
2. CRUSH CUSHION TYPES "G" AND "H" CAN BE USED ON TANGENT OR FLARED GUARDRAIL INSTALLATIONS.
3. USE ANCHOR TYPE 1 WHEN END OF GUARDRAIL INSTALLATION IS OUTSIDE 1.2 TIMES THE AASHTO REQUIRED CLEAR ZONE STD DWG BA 4C.
4. CONSIDER USING BURIED TERMINAL UDOT STD DWG BA 4D OR BA 4E WHEN CONDITIONS PERMIT.
5. CONSULT GUIDELINES FOR CRASH CUSHIONS AND STANDARD DRAWINGS FOR PROPER CRASH CUSHION SELECTION AND INSTALLATION.

FLARE RATE TABLE	
SPEED (MPH)	RATE
40 OR LESS	9:1
45	10:1
50	11:1
55	12:1
60	13:1
65	14:1
75 AND GREATER	15:1



TWO LANE/ TWO WAY
FLARED GUARDRAIL INSTALLATION
(DETAIL BA 4G-2)

REVISIONS			
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE

DEPUTY DIRECTOR

GUARDRAIL TYPICAL
2 LANE 2 WAY
INSTALLATION

STANDARD DRAWING TITLE

STD DWG
BA 4G

DGN File:N:\Esd\StandardDrawings\Imperial\Working\StandardsCommitteeFiles\BA04G.dgn
09-APR-2003

NOTES

1. WHEN USING GUARDRAIL BARRIER, AND A RAISED MEDIAN (ISLAND) IS PRESENT OR BEING CONSTRUCTED, AND THE MEDIAN CURB MEETS STD DWG GW 2 NOTE 3 CRITERIA, NOTE 2 DOES NOT APPLY.

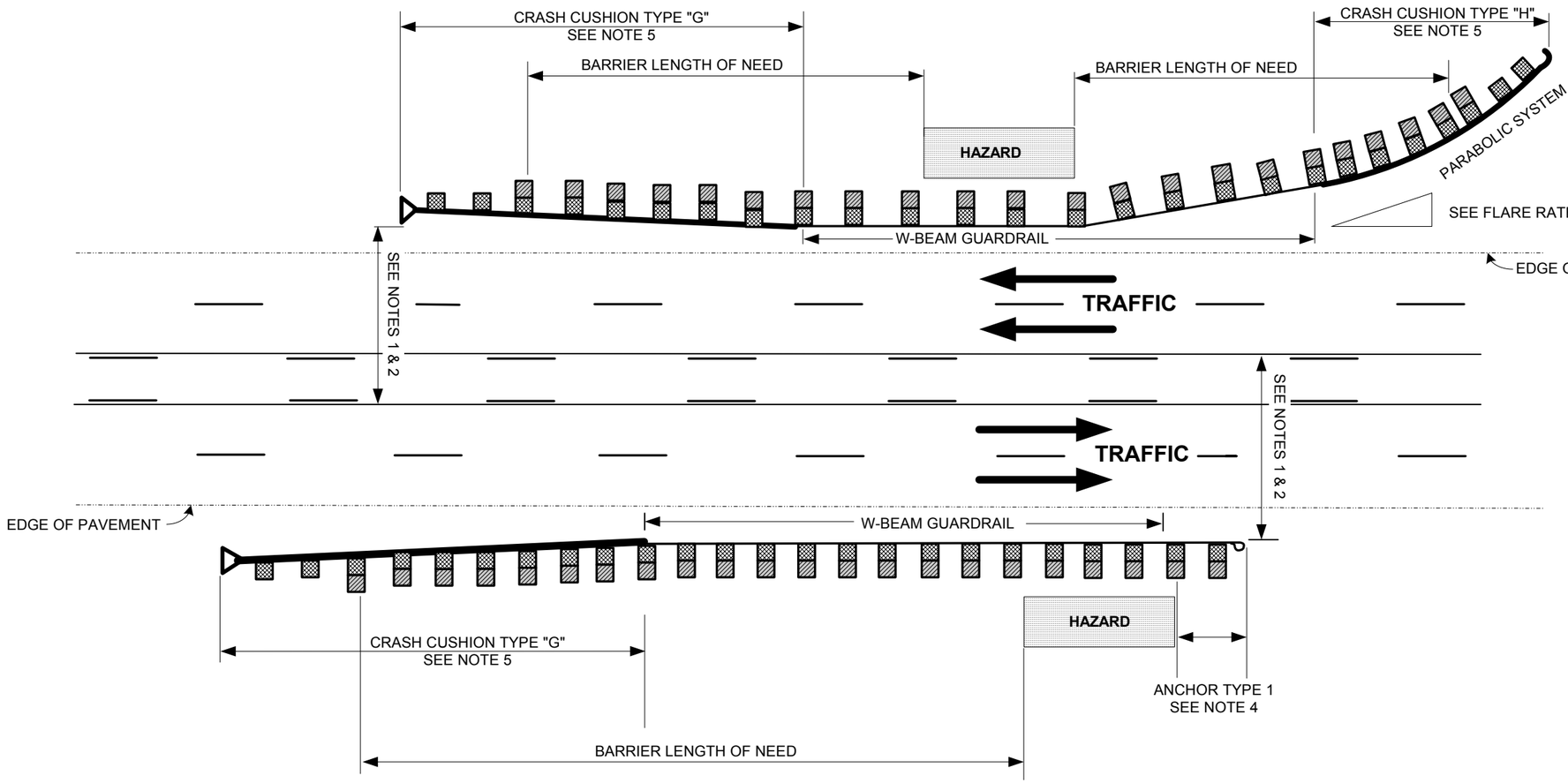
2. USE CRASH CUSHION WHEN END OF GUARDRAIL INSTALLATION IS WITHIN 1.2 TIMES THE AASHTO REQUIRED CLEAR ZONE.

3. CRASH CUSHION TYPES "G" AND "H" CAN BE USED ON TANGENT OR FLARED GUARDRAIL INSTALLATIONS.

4. USE ANCHOR TYPE I, STD DWG BA 4C, WHEN END OF GUARDRAIL INSTALLTION IS OUTSIDE 1.2 TIMES THE AASHTO REQUIRED CLEAR ZONE.

5. CONSIDER USING BURIED IN BACK SLOPE, UDOT STD DWG BA 4D OR BA 4E WHEN CONDTIONS PERMIT.

6. CONSULT GUIDELINES FOR CRASH CUSHIONS AND STD DWGS FOR PROPER CRASH CUSHION SELECTION AND INSTALLATION.



FLARE RATE TABLE	
SPEED(MPH)	RATE
40 OR LESS	9:1
45	10:1
50	11:1
55	12:1
60	13:1
65	14:1
75 AND GREATER	15:1

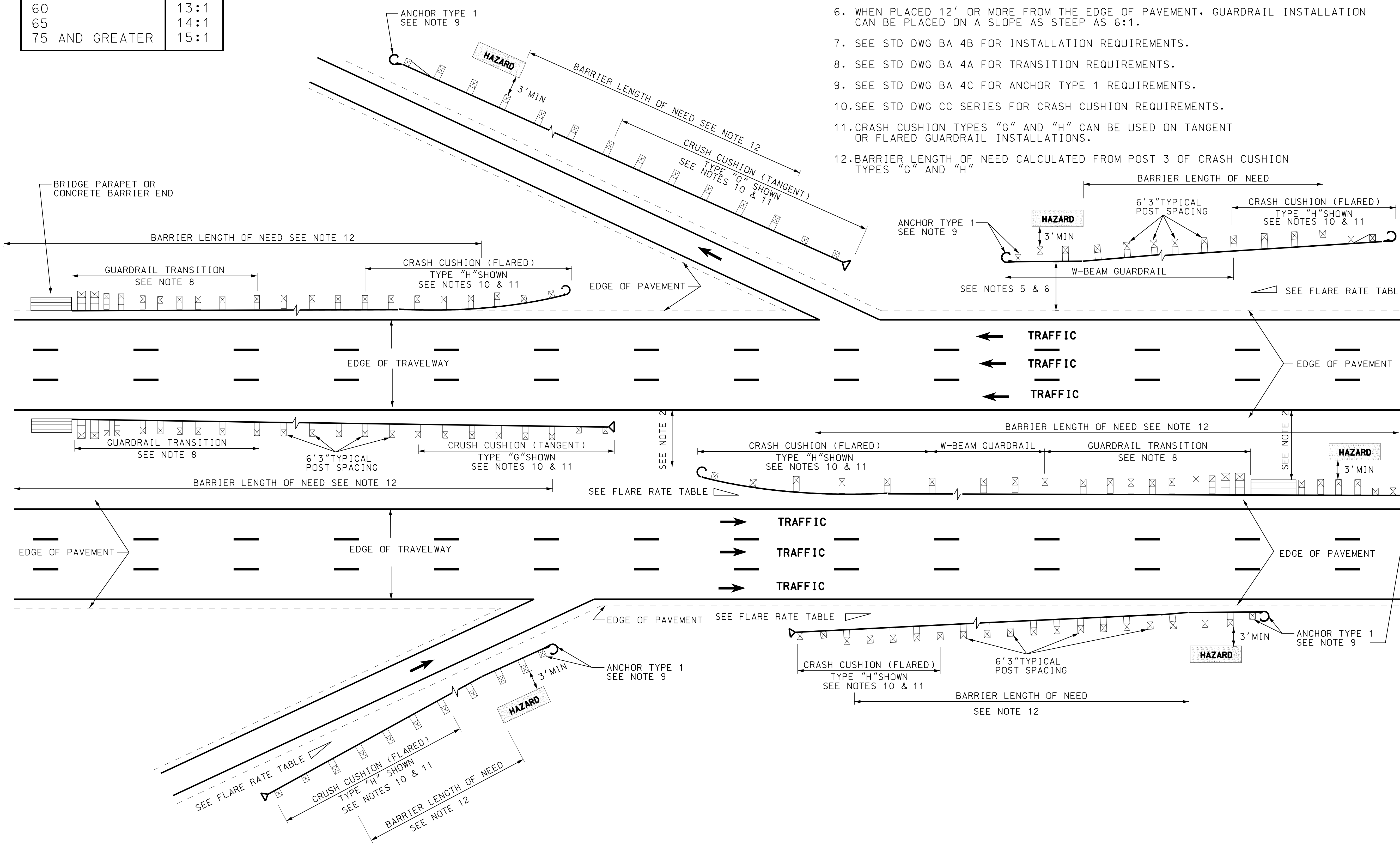
GUARDRAIL TYPICAL
MULTI LANE ARTERIAL

BA 4H
DRAFT

FLARE RATE TABLE	
SPEED (MPH)	RATE
40 OR LESS	9:1
45	10:1
50	11:1
55	12:1
60	13:1
65	14:1
75 AND GREATER	15:1

NOTES.

1. CRASH CUSHION REQUIRED WHEN BARRIER END OR PARAPET END IS WITHIN 1.2 TIMES AASHTO ROADSIDE DESIGN GUIDE CLEAR ZONE REQUIREMENTS.
2. MAINTAIN 1.2 TIMES AASHTO ROADSIDE DESIGN GUIDE CLEAR ZONE REQUIREMENTS.
3. CONSIDER USING BURIED END BACK SLOPE, UDOT STD DWG BA 4D OR BA 4E WHEN CONDITIONS PERMIT.
4. USE FLARED GUARDRAIL INSTALLATIONS WHEN POSSIBLE.
5. USE SLOPES NO STEEPER THAN 10:1 FROM THE EDGE OF PAVEMENT TO THE FACE OF THE GUARDRAIL WHEN PLACED WITHIN 12′ OF THE EDGE OF PAVEMENT.
6. WHEN PLACED 12′ OR MORE FROM THE EDGE OF PAVEMENT, GUARDRAIL INSTALLATION CAN BE PLACED ON A SLOPE AS STEEP AS 6:1.
7. SEE STD DWG BA 4B FOR INSTALLATION REQUIREMENTS.
8. SEE STD DWG BA 4A FOR TRANSITION REQUIREMENTS.
9. SEE STD DWG BA 4C FOR ANCHOR TYPE 1 REQUIREMENTS.
10. SEE STD DWG CC SERIES FOR CRASH CUSHION REQUIREMENTS.
11. CRASH CUSHION TYPES "G" AND "H" CAN BE USED ON TANGENT OR FLARED GUARDRAIL INSTALLATIONS.
12. BARRIER LENGTH OF NEED CALCULATED FROM POST 3 OF CRASH CUSHION TYPES "G" AND "H"



REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	01/29/03	G.S.	NEW DRAWING	

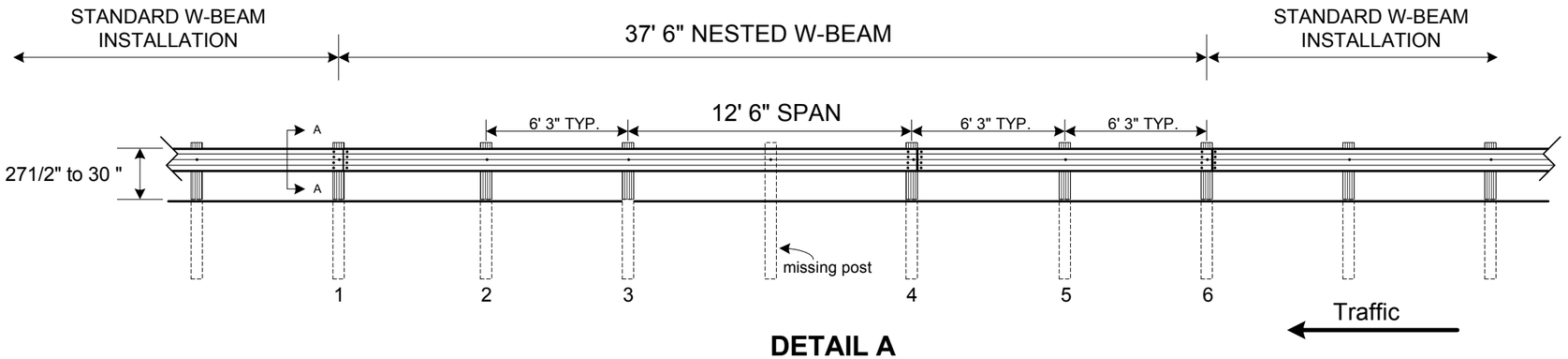
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE — APR.24,2003 DATE
APPROVED
DEPUTY DIRECTOR — APR.24,2003 DATE

GUARDRAIL TYPICALS DIVIDED ROADWAYS

STANDARD DRAWING TITLE

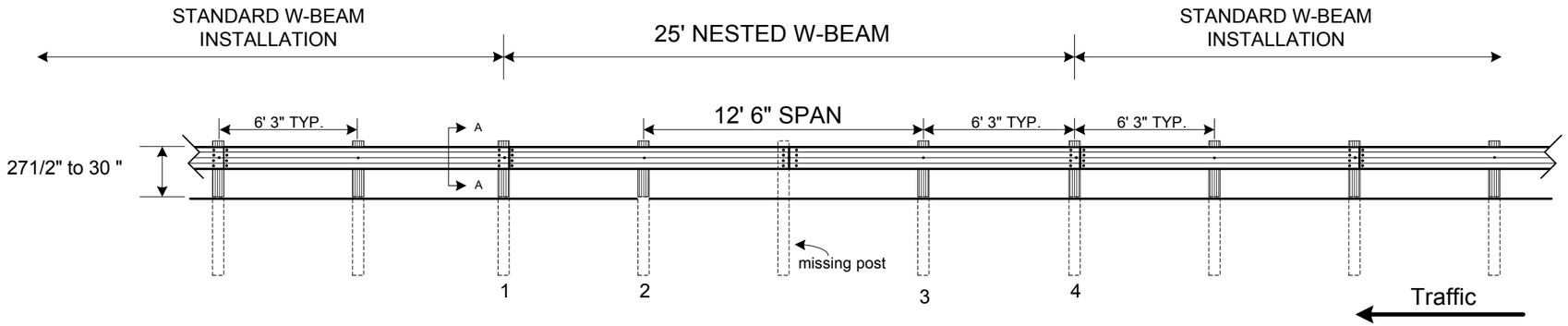
STD DWG
BA 4I



DETAIL A

NOTES FOR DETAIL "A"

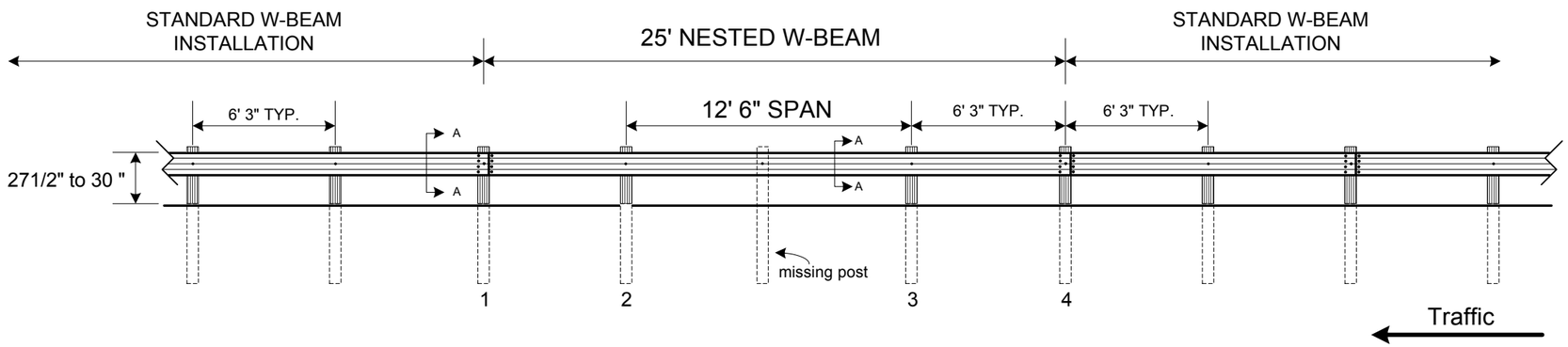
1. Splice point at post 4 of standard run using 25' W-beam panel, add an addtional 12'6" panel between post 4 and 6 required .
2. Place standard run over nesting rail elements.
3. Make all splices and bolt rail elements together as per standard guardrail installation requirements.



DETAIL B

NOTES FOR DETAIL "B"

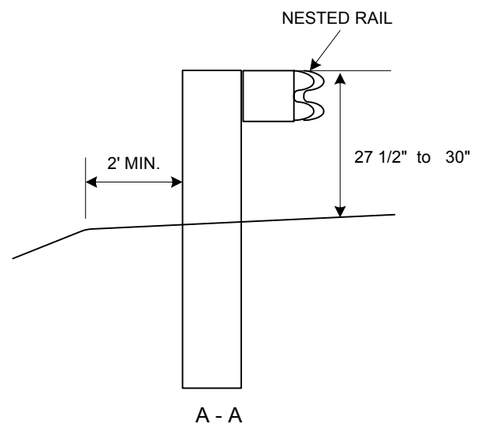
1. Splice point between post 2 and 3 of standard run using 25' W-beam panels.
2. Place nested elements behind standard run spanning post 1 through 4.
3. Make all splices and bolt rail elements together as per standard guardrail installation requirements.



DETAIL C

NOTES FOR DETAIL "C"

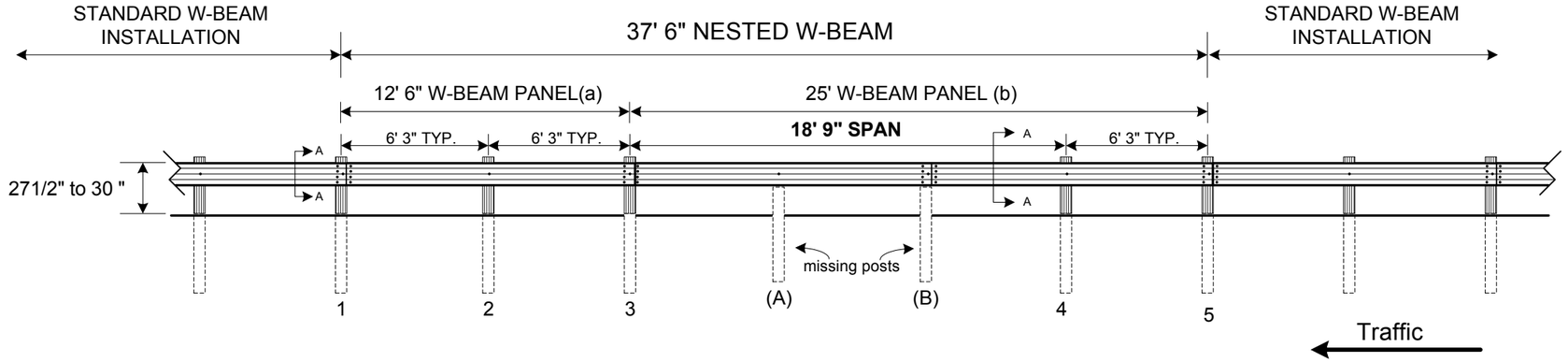
1. Splice point at post 1 and 4 of standard run using 25' W-beam panels.
2. Place a second W-beam panel behind standard run spanning post 1 through 4.
3. Make all splices and bolt rail elements together as per standard guardrail installation requirements.



A - A

BEAM GUARDRAIL
NESTED GUARDRAIL
12' 6' SPAN

BA 4J
DRAFT

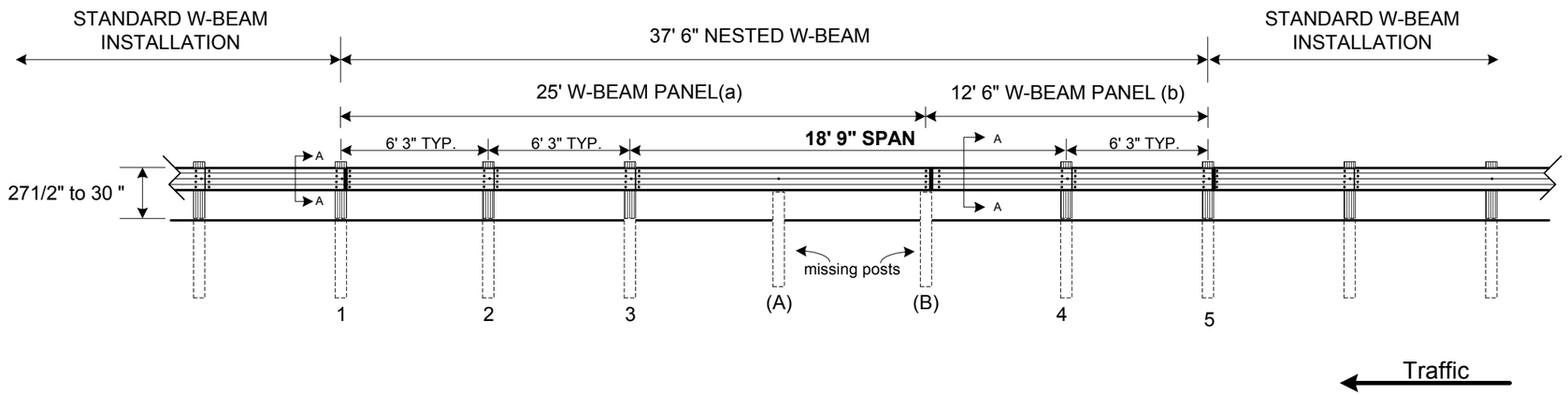


DETAIL A

WHEN END OF STANDARD RUN IS AT MISSING POST (A) or (B)

NOTES FOR DETAIL A

1. Place 12' 6" W-beam panel (a) spaning post 1 through 3. Place 25' W-beam panel (b) from post 3 to post 5, spanning missing posts (A) and (B).
2. Place standard run over nesting rail elements.
3. Make all splices and bolt rail elements together as per standard guardrail installation procedures.

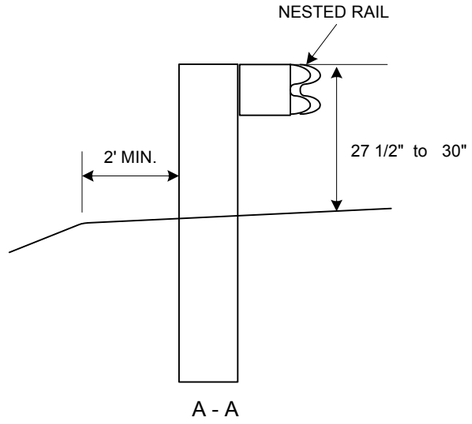


DETAIL B

WHEN END OF STANDARD RUN IS AT POST 4 OR 5

NOTES FOR DETAIL B

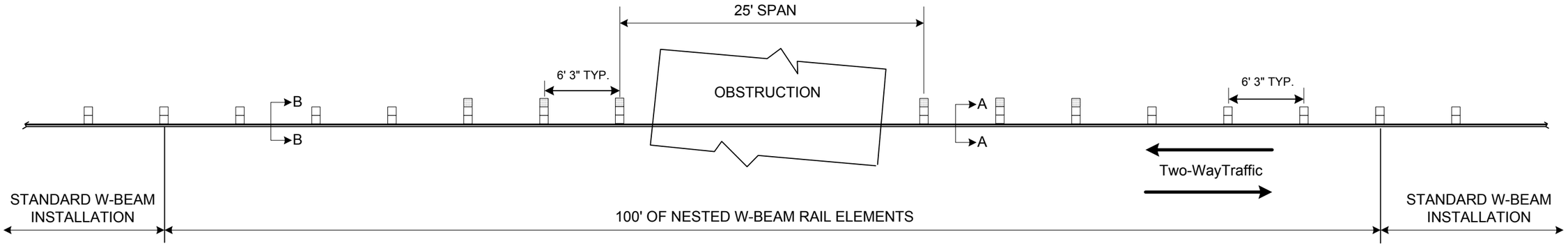
1. Place 12' 6" W-beam panel (b) from post 5 and splicing 25' W-beam panel at missing post (B) continue run to post 1.
2. Place standard run over nesting rail elements.
3. Make all splices and bolt rail elements together as per standard guardrail installation procedures.



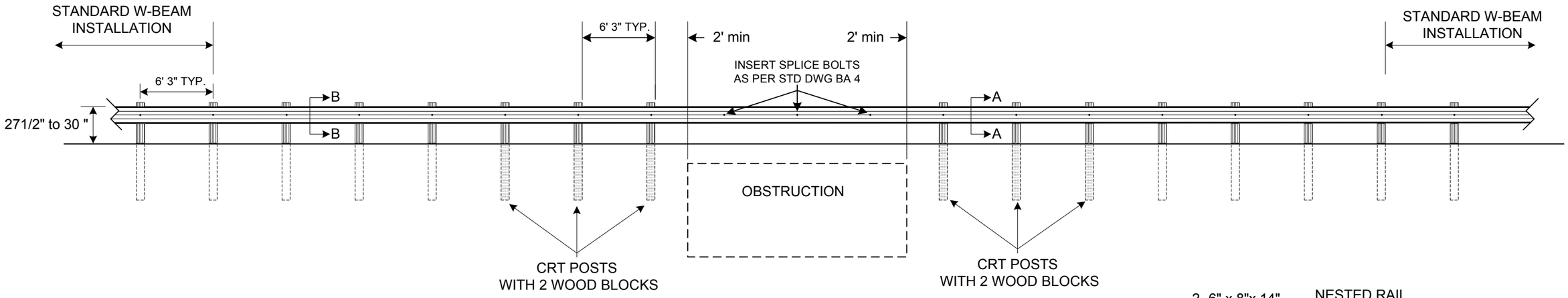
A - A

BEAM GUARDRAIL
NESTED GUARDRAIL
18' 9" SPAN

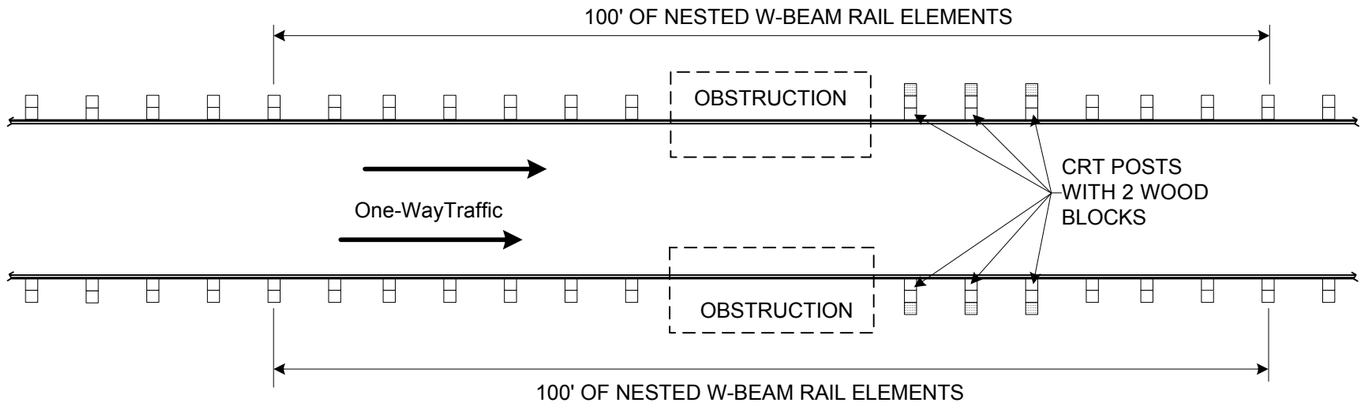
BA 4K
DRAFT



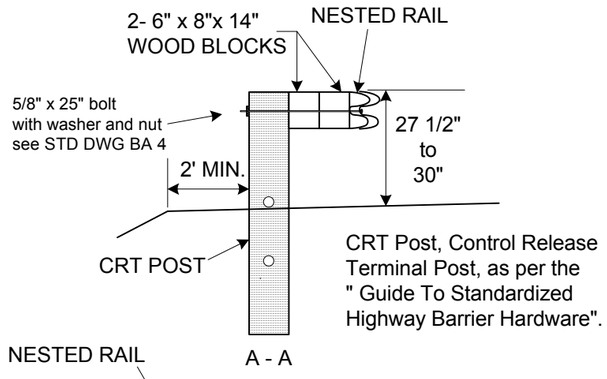
PLAN

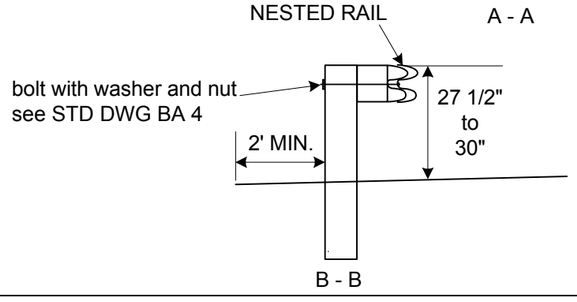


ELEVATION



ONE-WAY TRAFFIC LAYOUT





BEAM GUARDRAIL
NESTED GUARDRAIL
25' SPAN

BA 4L
DRAFT

SECTION 02841

TRAFFIC BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Beam guardrail, double beam guardrail, guardrail anchor, buried terminals, and guardrail transition elements.

B. Precast concrete barriers: standard, half, and terminal section.

C. Cast-in-place concrete barriers.

D. Traffic control cable.

1.2 RELATED SECTIONS

A. Section 01554: Traffic Control

B. Section 02324: Compaction

C. Section 02842: Delineators

D. Section 03055: Portland Cement Concrete

E. Section 03211: Reinforcing Steel and Welded Wire

F. Section 03390: Concrete Curing

G. Section 03392: Penetrating Concrete Sealer

H. Section 05120: Structural Steel

I. Section 06055: Timber and Timber Treatment

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. AASHTO M 180: Corrugated Sheet Steel Beams for Highway Guardrail.

C. AASHTO M 183: Structural Steel.

D. AASHTO M 270: Structural Steel for Bridges.

PART 2 PRODUCTS

2.1 BEAM GUARDRAIL

A. Galvanized beam guardrail elements including bolts in accordance with AASHTO M 180, Class A (0.10 inch thickness) Type 1.

B. Galvanized steel rub or bottom rail on double beam guardrail including bolts and fittings as specified in AASHTO M 183.

C. Anchor Elements
   a. Cable
   b. Anchor box
   c. Steel tube
   d. CRT post

D. Single Rail Buried Terminal
   a. Anchor option 1, post anchor
      1. Three (3) specialty posts, plates, and hardware as per STD DWG BA 4F
      2. 12' 6" W-Beam Guardrail panel as per this Section, Article 2.1
   b. Anchor option 2
      1. Concrete block anchor and hardware as per STD DWG BA 4F
      2. Transition connection as per STD DWG BA 4F
      3. 12' 6" W-Beam Guardrail panel as per this Section, Article 2.1

E. Buried Terminal with Rub Rail
   a. Anchor option 1, post anchor
      1. Two (2) specialty posts, plates, and hardware as per STD DWG BA 4F

2. One (1) 96" specialty post, plate, and hardware as per STD DWG BA 4F
3. 12' 6" W-Beam Guardrail panel as per this Section, Article 2.1
4. Design specific, w-beam rub rail, as per this Section, Article 2.1
   (a) Minimum 50 feet
5. Design specific, 96" long guardrail posts and blocks, as per this Section , Article 2.2.
   (a) Minimum posts required 7.

b. Anchor option 2
1. Concrete block anchor and hardware as per STD DWG BA 4F
2. Transition connection
3. 12' 6" W-Beam Guardrail panel as per this Section, Article 2.1
4. Design specific, w-beam rub rail, as per this Section, Article 2.1
   (a) Minimum 50 feet
5. Design specific, 96" long guardrail posts and blocks, as per this Section , Article 2.2.
   (a) Minimum post required 8.

F. Galvanizing. AASHTO M 111.

2.2 GUARD RAIL POSTS AND OFFSET BLOCKS

A. As specified.
1. Steel: Refer to Section 05120
2. Wood: Refer to Section 06055
3. Composite or plastic offset blocks for steel post installations
   a. Certify as to meeting NCHRP 350 test requirements

2.3 CONCRETE

A. Class AA(AE). Refer to Section 03055.

2.4 REINFORCING STEEL AND WELDED WIRE FABRIC

A. As specified. Refer to Section 03211.

2.5 BARRIER SEAL (FOR PRECAST CONCRETE BARRIER)

A. Polyester polyurethane open-cell foam 100 percent impregnated with asphalt.

B. Foam unit weight requirements:
1. Before impregnation: 68 lbs/yd^3 to 85 lbs/yd^3.
2. After impregnation: 252 lbs/yd^3 to 270 lbs/yd^3.

C. Impregnated asphalt foam should return to 95 percent of its original volume when compressed to 25 percent of its volume and released.

D. Impregnated asphalt foam must remain stable at temperatures ranging from -40 degrees F to +150 degrees F.

2.6 TRAFFIC CONTROL CABLE

A. Wood posts: Refer to Section 06055.

B. Polyethylene Tube: Yellow, with outside diameter of 1 3/16 inches with a wall thickness of 0.06 inch. Material and color stabilized for ultraviolet light.

C. Cable: 1/4 inch galvanized aircraft cable (7 x 19) with a breaking strength of 7,000 lbs.

D. Clip: 1/4 inch galvanized wire rope.

2.7 CONCRETE BARRIERS

A. Use the specified reinforcing steel as the reinforcing component. Refer to Section 03211.

B. Hot and cold weather limitations. Refer to Section 03055.

2.8 PRE-CAST CONCRETE BARRIER

A. Pre-qualify the fabricator as a supplier of pre-cast concrete products in accordance with the "Quality Management Plan: Precast-Prestressed Concrete Structures."

B. Mark each barrier with 2 inch numbers indicating the date of casting and identification number supplied by the inspector. Impress 1/4 inch deep into the top center of the barrier.

C. Prevent cracking or damage during handling and storage of precast units. Replace cracked or damaged precast units at no additional cost to the Department.

D. Accept for shipment when:
1. 28-day compressive strength acquired.
2. Cured and sealed according to specification.
3. Visually inspected and accepted by the Engineer.

2.9 BARRIER DELINEATION

A. Sheeting: Refer to Section 02842.

B. Hardware: Refer to Standard Drawing GW 9
   1. Plastic Brackets:
      a. High impact thermoplastic, resistant to ultraviolet rays.
      b. Minimum thickness: 0.075 inch.
      c. At break: elongation not to exceed 15 percent, and minimum tensile strength 5,400 psi.
      d. At yield: minimum tensile strength 4,000 psi.

   2. Steel bracket: Minimum thickness of 0.075 inch, galvanized steel, AASHTO M111 and as specified.

2.10 SURFACE SEALING MATERIAL (CAST-IN-PLACE CONSTANT SLOPE BARRIER)

A. Refer to Section 03392.

2.11 EXTRUSION AND SLIP FORM MACHINES FOR CAST-IN-PLACE CONSTANT SLOPE BARRIER

A. Capable of vertical adjustment to the grade line while in forward motion.

B. Equipment with an attached grade line gauge or pointer to make a continual comparison with the barrier being place and the offset guide line.

PART 3 EXECUTION

3.1 PREPARATION

A. Site considerations:
   1. Protect work area when removing traffic barriers and end sections until the barriers and end sections are reconstructed or the hazard is mitigated. Refer to Section 01554, Part 1, article, “Plan Requirement”, paragraph F.
   2. Beam Guardrail: Complete grading requirements prior to installation of guardrail and crash cushions.

3. Precast Concrete Barrier: Complete grading requirements and place any required paved surfaces as per applicable Standard Drawing before installing barrier. Complete grading requirements prior to installation of barrier or crash cushions.

B. For cast-in-place constant slope protection:
   1. Before applying curing compound, give the surface a final soft brush finish with strokes parallel to the line of barriers.
   2. Do not finish with a brush application of grout.
   3. Refer to Section 03392, Part 3, article, "Preparation."
   4. Complete grading requirements prior to installation of crash cushions.

3.2 POSTS

A. Drill all required hole in post and blocks as per Standard Drawing BA 4 prior to installation.

B. Drive posts if satisfactory results are obtained without damaging the post. When posts are driven through asphalt, seal area around posts with asphalt or concrete.

C. Excavate post holes when not driven.
   1. If hole is over excavated, compact approved backfill material into bottom of hole.
   2. Compact backfill material around post to a minimum of 96 percent of maximum laboratory density and dispose of excess material. Refer Section 02324.

D. Traffic control cable:
   1. Set posts so that the top of the posts provides a uniform grade line with no noticeable deviations in elevation.
   2. Notches and saw cuts in the posts may be made before placement in excavated holes. If using the driving method, make the notches and saw cuts after post placement.
      3. Refer to Standard Drawing BA 5 post embedment depth and saw cut requirements.

3.3 RAIL ELEMENTS

A. Punch or drill holes in rail element.
   1. Coat all field drilled rail elements with a field applied cold galvanizing material.

B. Curve rail elements before installation.

3.4 PRE-CAST CONCRETE BARRIERS

A. Installation includes moving, stockpiling, and placing all barriers.

B. Place seal between each barrier unit so that enough pressure is exerted on the sealing material to form and maintain a permanent bond.

3.5 CAST-IN-PLACE CONSTANT SLOPE BARRIER

A. Obtain approval from the Engineer before placing the material.

B. Conform to Standard Drawing BA 3.

C. Fixed forms: Do not use precast mortar blocks to support the reinforcing steel.

D. Constant slope barrier placed by extrusion or slip form:
   1. Provide an offset guide line for the extrusion or slip form machine to maintain the predetermined grade.
   2. Feed concrete to the extrusion or slip form machine at a uniform rate.
   3. Operate machine, uniformly restraining forward motion.
      a. Produce well-compacted, dense concrete with consistency that maintains the shape of the barrier without support.
      b. Produce a well-compacted mass of concrete free from surface pits larger than 1 inch in diameter and requiring no further finishing.
   4. Saw or form joints before applying curing compound.

E. Curing: Refer to Section 03390.

F. Coating:
   1. Application rate based on resident content at a coverage rate of 0.11 lbs/yd^2.
   2. Apply according to the manufacturer's recommendation for horizontal, vertical, and overhead surfaces.
   3. Select a sealer with maximum drying time of 1 1/2 hour.

3.6 TRAFFIC CONTROL CABLE

A. Apply enough tension to eliminate sags greater than 3 inches in the cable.

3.7 BARRIER DELINEATOR

A. Concrete Barrier: Attach L-shaped delineator. Refer to Standard Drawing GW 9.

B. Beam Guardrail: Attach straight delineator. Refer to Standard Drawing GW 9.

C. Attachment Location:
   1. Precast concrete barrier: Refer to Standard Drawing BA 1B.
   2. Precast 1/2 section concrete barrier: Refer to Standard Drawing BA 2.
   3. Constant Slope cast in place barrier: Refer to Standard Drawing BA 3.
   4. Beam Guardrail: Refer to Standard Drawing BA 4.
   5. Traffic Control cable: Refer to Standard Drawing BA 5.

D. Application:
   1. Refer to Standard Drawing GW 10.

END OF SECTION

Standard Committee Submittal Sheet

Name of preparer: Glenn Schulte
Title/Position of preparer: Transportation Specialist
Specification/Drawing/Item Title: Crash Cushion Details
Specification/Drawing Number: CC 7A, CC 7B, CC 8A, CC 8B
Date Process Started: _____ Date Process Completed: _____
Status: ‘ Approved ‘ Disapproved ‘ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)
Bolded items below were added/updates on April 2, 2003.

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest.

1. The current drawings have two system types on them. Contractors as well as designers were getting the different systems mixed up as for application and installation. The Design unit of each of the Regions felt the drawings were to cluttered and didn't give the appropriate information. I also had this same comment from several design consultants.

2. National standards, Roadside Design Guide, changed and we are meeting the minimum requirements for those standards. Transition length change, we included a table for applicable tapers and distances.

3. Systems changed with different post applications. Wood and steel. Installation requirements are more clearly defined (ie: application requirements, foundation tube requirements, and grading requirements).

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

NO CHANGE

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

In-house (for example, **preconstruction**, materials, construction, safety, design, maintenance) **(Include all applicable in-house areas even if not listed above.)**

Construction Engineers

On several project reviews John Leonard and I conducted, both Project Engineers and Construction Techs stated that it would be helpful if the drawing had more installation requirements for the particular systems. Notes have been added addressing these needs.

Contractors

Suppliers

Trinity Industries, ET-2000, ET-PLUS, STR-350 & SRT/HBA
Randy Olson & Chuck Norton, several discussions concerning the proper design and installation of their products.

Road Systems, Inc, SKT-350, FLEAT, Mr. John Durkos, several discussions concerning the proper design and installation of his products.

Consultants (as required)

Others (as appropriate)

D. Costs? (Estimates are acceptable.)

1. Additional costs to average bid item price**.**

This is hard to quantify as the site determines the amount of work that would be required. The extra cost would be additional amount of fill, time and equipment required to construct the required approach pads. However, this is the minimum work required to bring our standards into compliance.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, **programming**). NO CHANGE

3. Life cycle cost.

E. Safety Impacts?

The additional approach area will enhance an errant drivers ability to recover their vehicle prior to impacting the crash cushion.
The additional notes will give both our inspectors and contractors the requirements needed to install these systems so they perform in their intended manner.

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

These systems are under constant review, both in testing and in operational use, by the manufacture, FHWA , and the agencies that use them.

CRASH CUSHION TYPE F

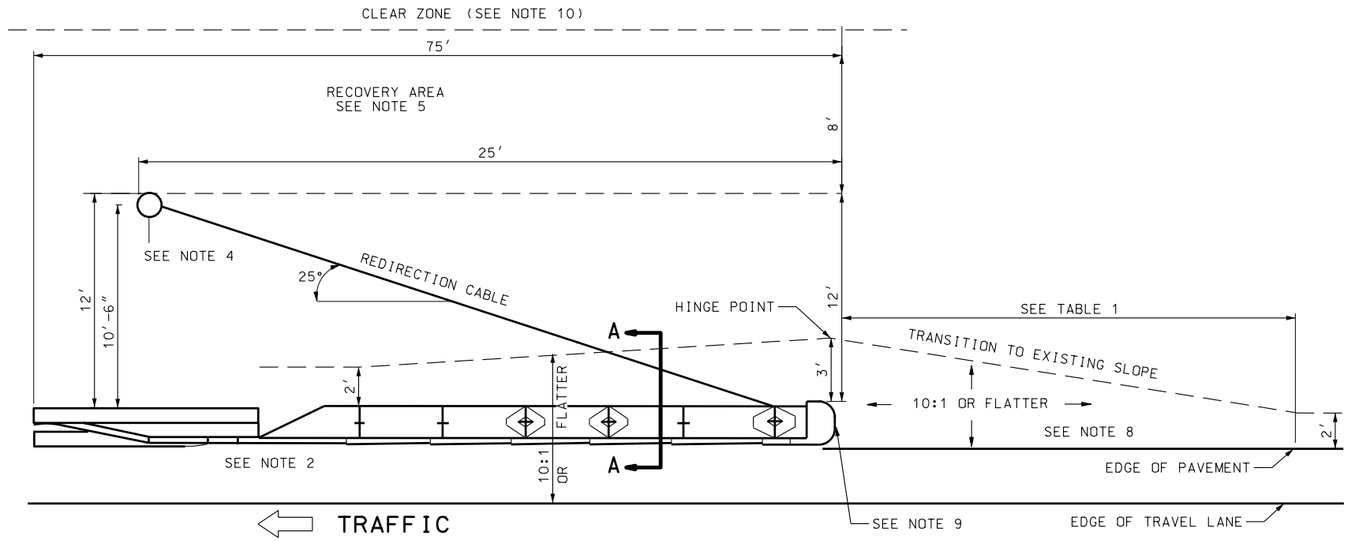
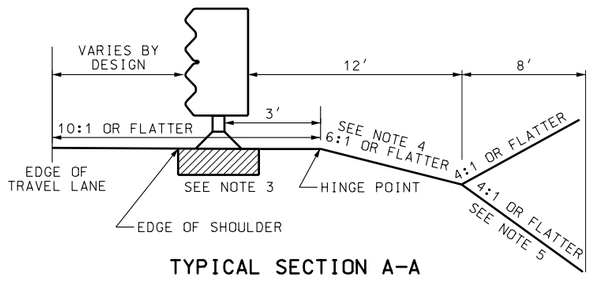


TABLE 1

SPEED MPH	TAPER	MINIMUM LENGTH FEET
LESS THAN 40	7:1	70
40 TO 55	10:1	100
60 TO 75	15:1	150



TYPICAL SECTION A-A

SEE NOTE 5

NOTES FOR CRASH CUSHION TYPE F

1. THE QUADTREND-350 IS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS. USE MANUFACTURER'S AND UDOT'S REQUIREMENTS WHEN INSTALLING SYSTEM.
2. USE THE QUADTREND-350 WHEN A DIRECT ATTACHMENT TO A CONCRETE BARRIER OR BRIDGE PARAPET IS REQUIRED AND THERE IS LESS THAN 125 FEET OF LONGITUDINAL SPACE IN FRONT OF THE HAZARD.
3. INSTALL CONCRETE PAD AS PER MANUFACTURER'S REQUIREMENTS.
4. PLACE CABLE ANCHOR FOUNDATION IN SUCH A MANNER THAT THE REDIRECTING CABLE LAYS 6:1 OR FLATTER ON TOP OF THE GROUND, AND THE FOUNDATION WITH THE CABLE ANCHOR BRACKET, WHEN ATTACHED TO FOUNDATION, DOES NOT EXCEED 4 INCHES ABOVE GROUND LEVEL. DO NOT BURY THE REDIRECTION CABLE. REFERENCE STD DWG SN 6, BREAKAWAY POST STUB DETAIL.
5. USE A 4:1 OR FLATTER SLOPE IN RECOVERY AREA. WHEN USED WITH A CUT SLOPE A 6:1 OR FLATTER FILL AREA 12 FT. X 25 FT. IS REQUIRED PRIOR TO THE CUT SLOPE. INCLUDE THIS AREA AS PART OF THE RECOVERY AREA.
6. CLEAR THE RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
7. PLACE SAND CONTAINERS ON POSTS 1, 3 AND 4.
8. COMPLETE ALL GRADING REQUIREMENTS PRIOR TO SYSTEM INSTALLATION.
9. INSTALL REQUIRED MARKING AS PER STD DWG CC 1.
10. MAINTAIN AASHTO CLEAR ZONE FOR SPEEDS GREATER THAN 40 MPH. DEPENDING ON SYSTEM OFFSET, CLEAR ZONE MAY EXTEND OUTSIDE OF THE RECOVERY AREA.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/16/02	F.W.	CRASH CUSHION TYPE G - CORRECTED STD DWG CALLOUT FROM BA 2B TO BA 4A IN NOTE 6.
2	04/03/03	G.S.	REVISED CLEAR ZONE REQUIREMENT, ADDED TABLE 1, ADDED NOTE 7.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — APR.24,2003 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — APR.24,2003 DATE

DEPUTY DIRECTOR

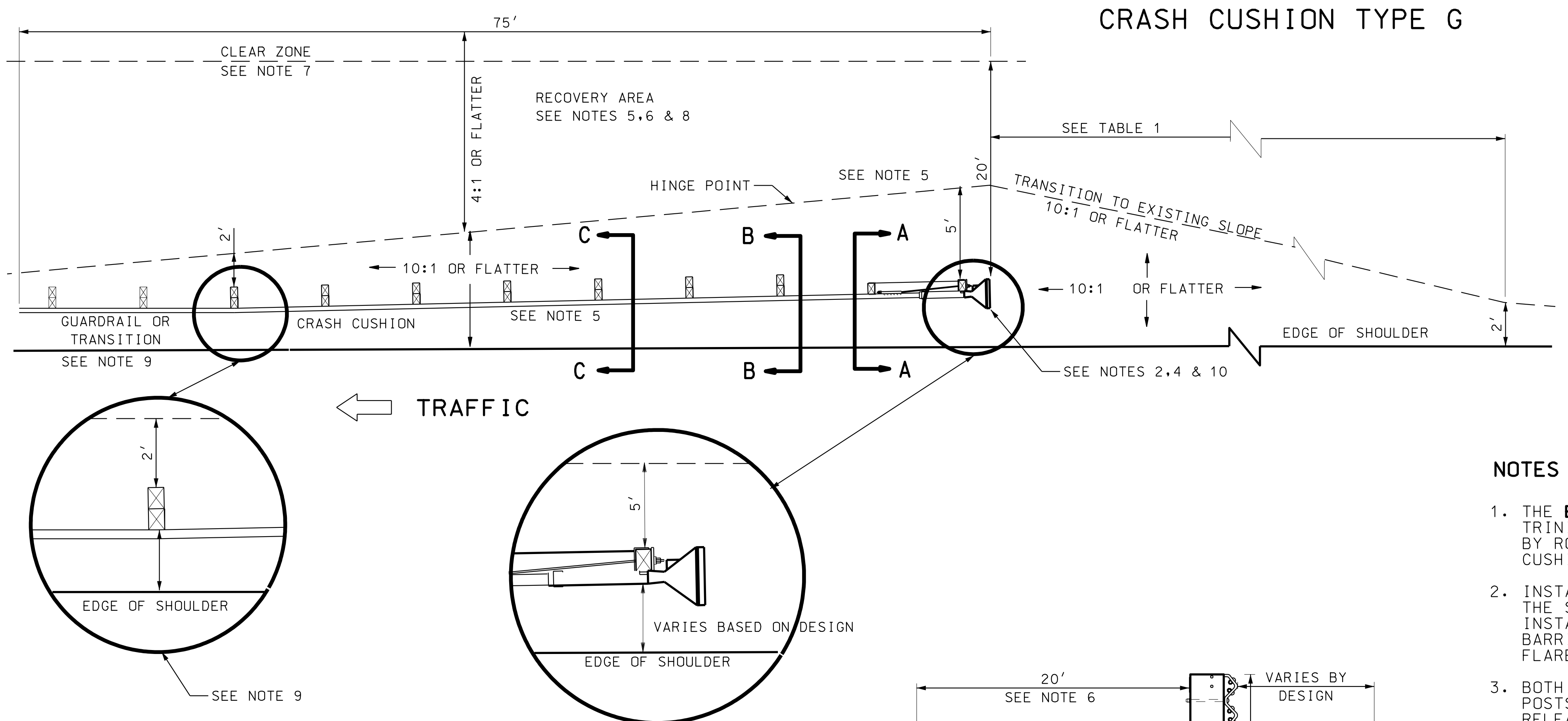
GRADING & INSTALLATION DETAILS CRASH CUSHION TYPE F

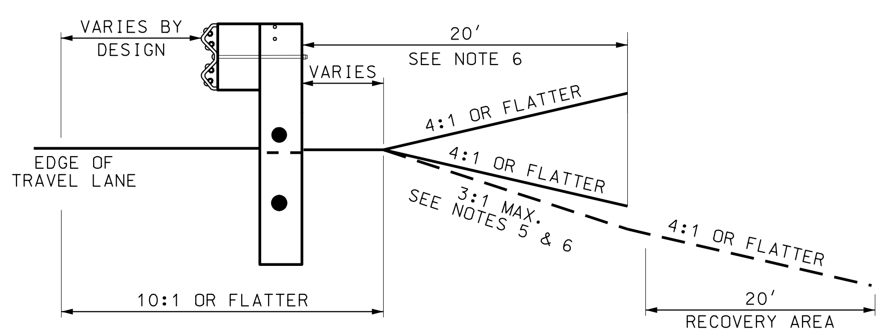
STANDARD DRAWING TITLE

STD DWG
CC 7A

DGN File: N:\Esd\Standard Drawings\Imperial\Working\StandardsCommitteeFiles\CC07A.dgn
09-APR-2003

CRASH CUSHION TYPE G

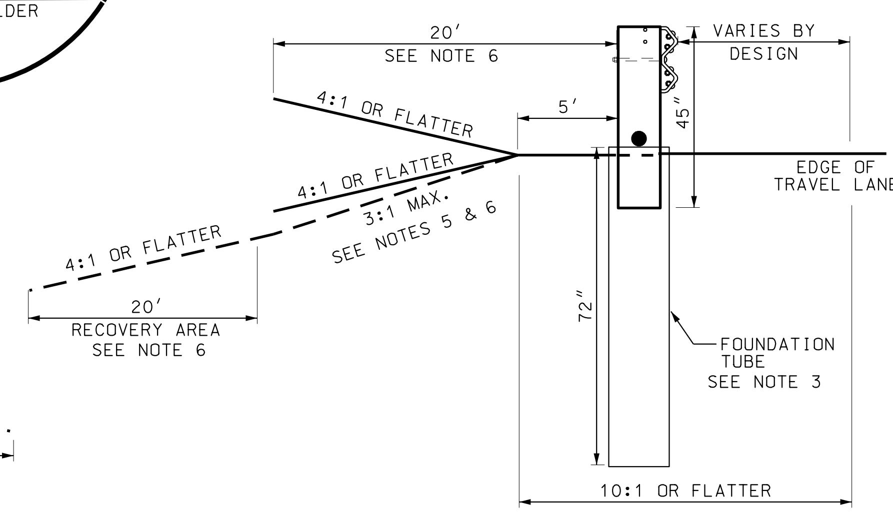




TYPICAL SECTION C-C

POSTS 5-8

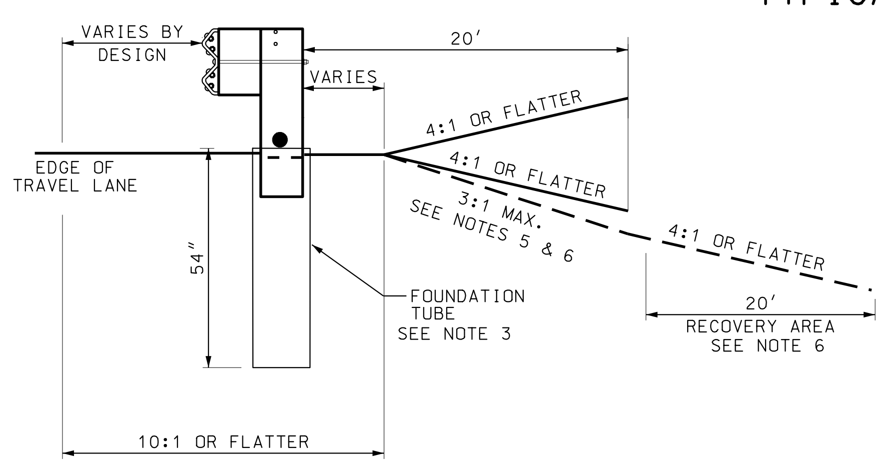
SEE NOTE 3



TYPICAL SECTION A-A

POSTS 1-2

SEE NOTES 2 & 3



TYPICAL SECTION B-B

POSTS 3-4

TABLE 1

SPEED MPH	**TAPER**	**MINIMUM LENGTH** FEET
LESS THAN 40	7:1	70
40 TO 55	10:1	100
60 TO 75	15:1	150

NOTES FOR END SECTION TYPE "G"

1. THE **ET-PLUS**, MANUFACTURED BY **SYRO INC.**, TRINITY INDUSTRIES AND, THE **SKT-350**, MANUFACTURED BY ROAD SYSTEMS INC. ARE THE APPROVED CRASH CUSHION SYSTEMS.

2. INSTALL SYSTEMS AT A 50:1 FLARE FROM THE REAR OF THE SYSTEM, WHEN USED ON A TANGENT BARRIER INSTALLATION. WHEN SYSTEM IS USED WITH A FLARED BARRIER INSTALLATION, INSTALL SYSTEM AT THE SAME FLARE RATE AS THE BARRIER INSTALLATION.

3. BOTH SYSTEMS HAVE OPTIONS OF WOOD BREAKAWAY POSTS WITH FOUNDATION TUBES AND CONTROL RELEASE TERMINAL (**CRT**) POSTS, OR STEEL BREAKAWAY POST INSTALLATIONS. REFER TO THE GUIDELINES FOR CRASH CUSHIONS FOR ACCEPTABLE SYSTEM REQUIREMENTS. USE ONLY THE MANUFACTURER'S SPECIFIED STEEL BREAKAWAY POSTS WITH THE SUPPLIED SYSTEM.
   SYSTEMS USE A 72 INCH FOUNDATION TUBE AT POSTS 1 AND 2 AND A 54 INCH FOUNDATION TUBE AT POSTS 3 AND 4. POST 1 THROUGH 4 ARE SHORTENED BREAKAWAY POSTS AS SUPPLIED BY THE MANUFACTURER. THE TOP OF THE FOUNDATION TUBE IS NO GREATER THAN 4 INCHES ABOVE GROUND LINE.
   WHEN SYSTEM IS INSTALLED USING **CRT** POSTS, THE BOTTOM OF THE TOP HOLE IS AT GROUND LEVEL. DO NOT PLACE STEEL BREAKAWAY POST HINGE POINTS BELOW GROUND LINE OR GREATER THAN 1 INCH ABOVE GROUND LINE.

4. **ET-PLUS:** DO NOT ATTACH RAIL AT POSTS 1 AND 5 WITH A POST BOLT. **SKT-350:** DO NOT ATTACH RAIL AT POST 1 WITH A POST BOLT.

5. COMPLETE SLOPE GRADING REQUIREMENTS PRIOR TO INSTALLATION. A SLOPE OF 10:1 TO THE RAIL ELEMENT FACE, APPROACH AREA AND DIRECTLY BEHIND THE SYSTEM IS REQUIRED. NO SLOPES GREATER THAN 4:1 TO THE EXISTING SLOPE AT THE HINGE POINTS BEHIND THE SYSTEM AND THE APPROACH AREA TRANSITION.

6. USE A 4:1 OR FLATTER FILL SLOPE IN RECOVERY AREA, IF IMPRACTICAL, USE A MAXIMUM 3:1 FILL SLOPE AND ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FILL SLOPE. WHEN USED WITH A CUT SLOPE, A 4:1 OR FLATTER CUT IS REQUIRED IN THE RECOVERY AREA.

7. RECOVER AREA 20 FEET X 75 FEET MINIMUM. MAY NEED TO BE GREATER TO MEET AASHTO CLEAR ZONE REQUIREMENTS FROM THE EDGE OF TRAVEL LANE.

8. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.

9. USE GUARDRAIL TRANSITION, STD DWG BA 4A, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.

10. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.

11. REFER TO THE GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM INFORMATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/16/02	F.W.	CRASH CUSHION TYPE G - CORRECTED STD DWG CALLOUT FROM BA 2B TO BA 4A IN NOTE 6.
2	01/28/03	G.S.	MOVE CRASH CUSHION TYPE F, REWROTE ALL NOTES, ADDED TYPICAL SECTION B-B AND ADDED TABLE 1

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL

APR.24,2003 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

APR.24,2003 DATE

DEPUTY DIRECTOR

GRADING & INSTALLATION DETAILS CRASH CUSHIONS TYPE "G"

STANDARD DRAWING TITLE

STD DWG

CC 7B

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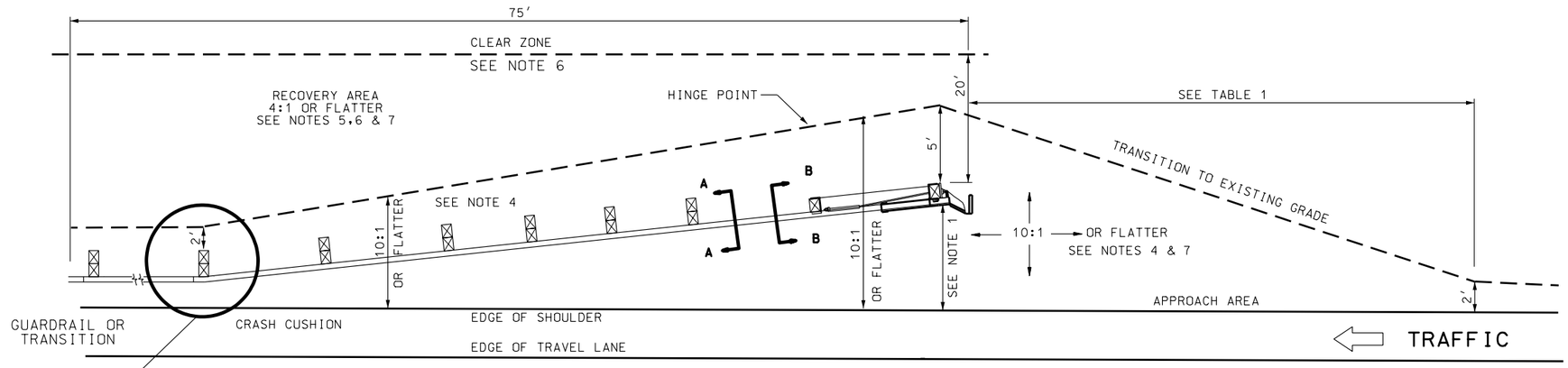
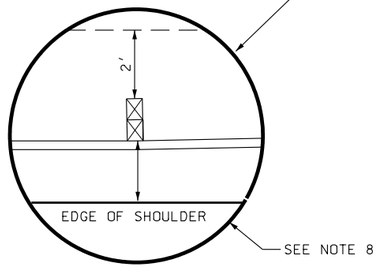
09-APR-2003

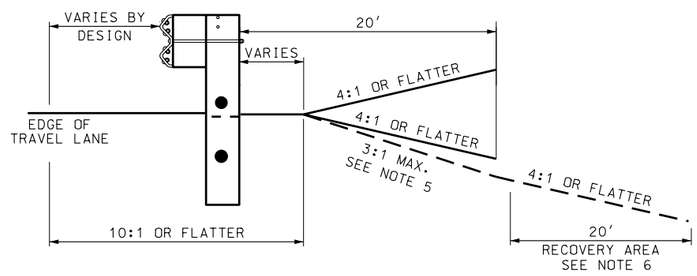


FLEAT - 350 / SRT-350/HBA

WOOD POST
OPTION SHOWN
SEE NOTE 2

SEE NOTE 3 & 8



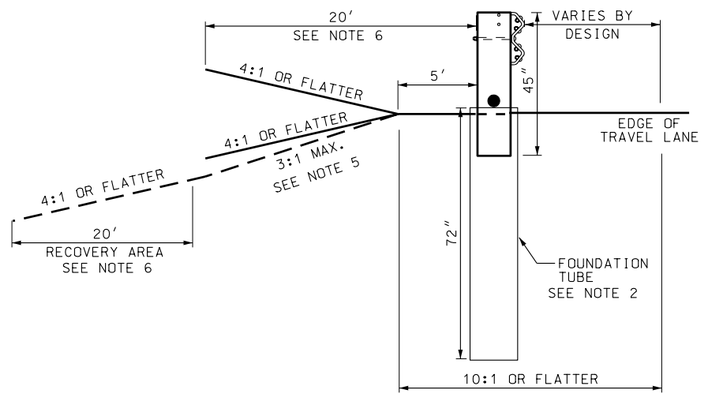


TYPICAL SECTION A-A

POST 3-8

TABLE 1

SPEED MPH	TAPER	MINIMUM LENGTH FEET
LESS THAN 40	7:1	70
40 TO 55	10:1	100
60 TO 75	15:1	150



TYPICAL SECTION B-B

POST 1-2

SEE NOTES 2 & 3

NOTES FOR END SECTION TYPE "H"

1. THE **FLEAT-350**, MANUFACTURED BY ROAD SYSTEMS, INC. AND THE **SRT-350/HBA**, MANUFACTURED BY **SYRO INC.**, TRINITY INDUSTRIES. BOTH SYSTEMS INCORPORATE A STRAIGHT LINE FLARE. INSTALL SYSTEMS WITH A 4 FOOT OFFSET WHEN INSTALLED WITH A TANGENT BARRIER INSTALLATION. WHEN USING A FLARED BARRIER INSTALLATION INSTALL AT THE SAME FLARE RATE AS THE BARRIER.

2. **FLEAT-350** USES WOOD CONTROL RELEASE TERMINAL (**CRT**) POSTS AND WOOD BLOCKS, OR STEEL BREAKAWAY POSTS WITH ROUTED WOOD BLOCKS OR COMPOSITE BLOCKS. SYSTEM USES FOUNDATION TUBES AT POSTS 1 AND 2 FOR BOTH APPLICATIONS. THE TOP OF FOUNDATION TUBE IS NO GREATER THAN 4 INCHES ABOVE GROUND LINE. WHEN SYSTEM IS INSTALLED USING CRT POSTS, THE BOTTOM OF TOP HOLE IS AT GROUND LEVEL. WHEN SYSTEM IS INSTALLED USING STEEL BREAKAWAY POSTS, USE ONLY THE MANUFACTURER'S SPECIFIED STEEL BREAKAWAY POSTS AND THE BREAKAWAY JOINT IS PLACED 1 INCH ABOVE GROUND LINE.

3. **SRT-350/HBA** USES STEEL HINGED BREAKAWAY POSTS AT POSTS 1 AND 2 AND STANDARD **CRT** POSTS AT POSTS 4 THROUGH 6. USE ONLY THE MANUFACTURER'S SPECIFIED STEEL BREAKAWAY POSTS. THE BREAKAWAY JOINTS ARE PLACED AT GROUND LINE. THE BOTTOM OF THE TOP HOLE OF THE **CRT** POSTS ARE PLACED AT GROUND LEVEL. THE LAST POST OF THE GUARDRAIL INSTALLATION, WHEN THIS SYSTEM IS USED, IS REQUIRED TO BE A CRT POST AND IS NOT PART OF THIS SYSTEM. THIS SYSTEM CANNOT BE USED WITH A TRANSITION ELEMENT STD DWG BA 4A, EXCEPT AS SPECIFIED IN NOTE 8.

4. COMPLETE SLOPE GRADING REQUIREMENTS PRIOR TO INSTALLATION. A SLOPE OF 10:1 TO THE RAIL ELEMENT FACE, APPROACH AREA AND DIRECTLY BEHIND THE SYSTEM IS REQUIRED. NO SLOPES GREATER THAN 4:1 TO THE EXISTING SLOPE AT THE HINGE POINTS BEHIND THE SYSTEM AND THE APPROACH AREA TRANSITION.

5. USE A 4:1 OR FLATTER FILL SLOPE IN RECOVERY AREA, IF IMPRACTICAL, USE A MAXIMUM 3:1 FILL SLOPE AND ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FILL SLOPE. WHEN USED WITH A CUT SLOPE, A 4:1 OR FLATTER CUT IS REQUIRED IN THE RECOVERY AREA.

6. RECOVERY AREA 20 FEET X 75 FEET MINIMUM. MAY NEED TO BE GREATER TO MEET AASHTO CLEAR ZONE REQUIREMENTS FROM THE EDGE OF TRAVEL LANE.

7. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.

8. USE GUARDRAIL TRANSITION, STD DWG BA 4A, WHEN ATTACHING THE **FLEAT-350** SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET. THE **SRT-350/HBA** CANNOT BE DIRECTLY ATTACHED TO THE TRANSITION ELEMENT. AN ADDITIONAL $12\frac{1}{2}$ FOOT SECTION OF STANDARD GUARDRAIL WITH A **CRT** POST AT THE ATTACHMENT POST IS REQUIRED.

9. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.

10. REFER TO THE GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM INFORMATION.

NO.	DATE	APPR.	REMARKS
1	01/29/03	G.S.	NEW DRAWING

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — APR.24.2003 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — APR.24.2003 DATE

DEPUTY DIRECTOR

GRADING & INSTALLATION DETAIL CRASH CUSHION TYPE H

STANDARD DRAWING TITLE

STD DWG
CC 8A

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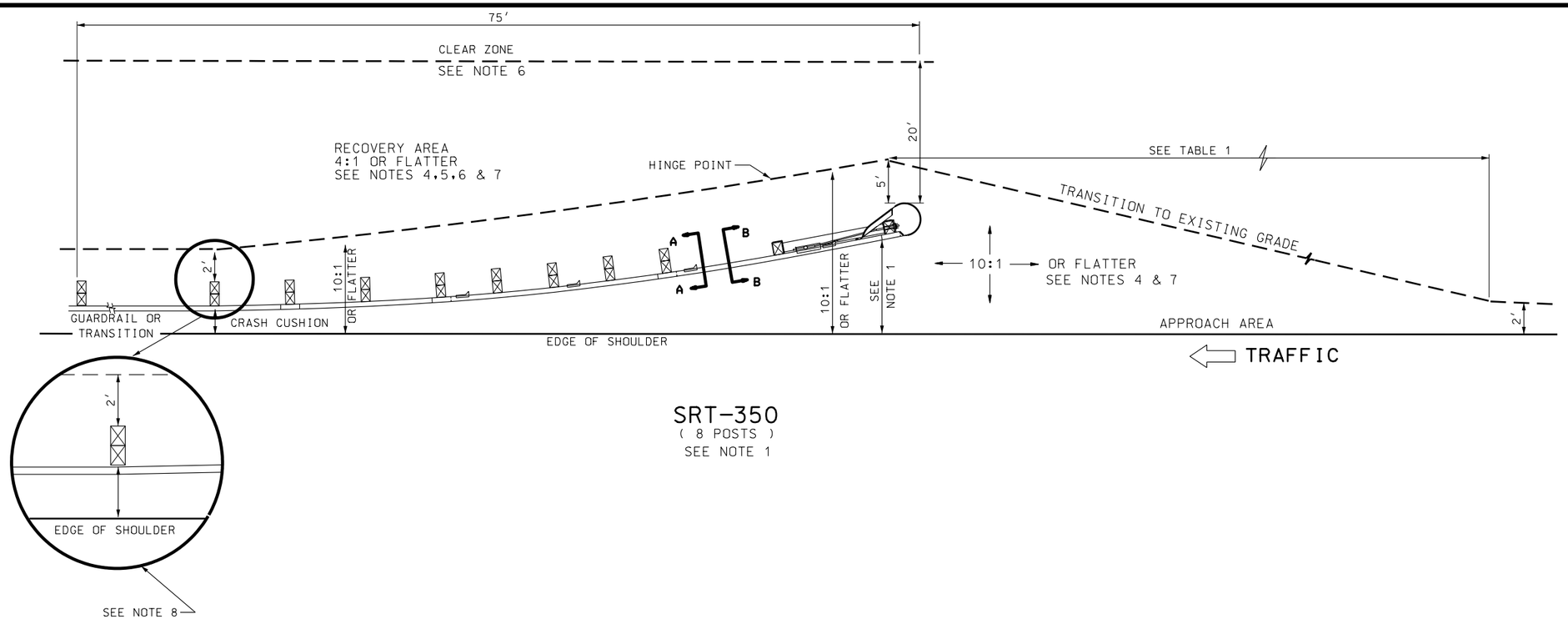
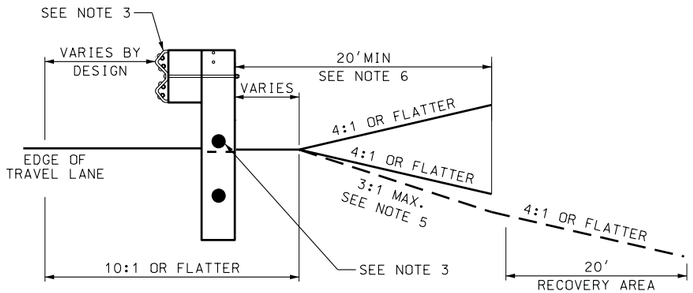
09-APR-2003



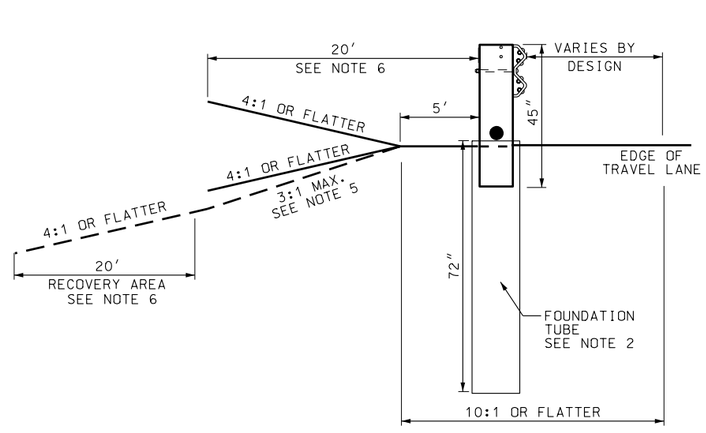
SRT-350
(8 POSTS)
SEE NOTE 1



TYPICAL SECTION A-A
POSTS 3-8

TABLE 1

SPEED MPH	TAPER	MINIMUM LENGTH FEET
LESS THAN 40	7:1	70
40 TO 55	10:1	100
60 TO 75	15:1	150



TYPICAL SECTION B-B
POSTS 1-2

NOTES FOR END SECTION TYPE "H"

1. THE **SRT-350** (8 POST SYSTEM), MANUFACTURED BY **SYRO INC.**,TRINITY INDUSTRIES. THE **SRT-350** INCORPORATES A PARABOLIC FLARE. INSTALL THIS SYSTEM USING A 4 FOOT OFFSET, FOLLOWING THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SYSTEM CAN BE USED WITH TANGENT OR FLARED BARRIER INSTALLATIONS.
2. USE FOUNDATION TUBES, 72 INCHES LONG, AND SHORTEN BREAKAWAY POSTS AT POST 1 AND 2. THE TOP OF FOUNDATION TUBE IS NO GREATER THEN 4 INCHES ABOVE GROUND LEVEL.
3. SYSTEM USES WOOD CONTROL RELEASE TERMINAL (**CRT**) POSTS AT POSTS 3 THROUGH 8 WITH WOOD BLOCKS AND SLOTTED RAIL ELEMENTS. PLACE THE BOTTOM OF THE TOP HOLE OF THE **CRT** POST AT GROUND LEVEL. RAIL ELEMENT IS NOT ATTACHED AT POSTS 7 AND 8.
4. COMPLETE SLOPE GRADING REQUIREMENTS PRIOR TO INSTALLATION. A SLOPE OF 10:1 TO THE RAIL ELEMENT FACE, APPROACH AREA AND DIRECTLY BEHIND THE SYSTEM IS REQUIRED. NO SLOPES GREATER THAN 4:1 TO THE EXISTING SLOPE AT THE HINGE POINTS BEHIND THE SYSTEM AND THE APPROACH AREA TRANSITION.
5. USE A 4:1 OR FLATTER FILL SLOPE IN RECOVERY AREA, IF IMPRACTICAL, USE A MAXIMUM 3:1 FILL SLOPE AND ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FILL SLOPE. WHEN USED WITH A CUT SLOPE A 4:1 OR FLATTER CUT IS REQUIRED IN THE RECOVERY AREA.
6. RECOVERY AREA 20 FEET X 75 FEET MINIMUM. MAY NEED TO BE GREATER TO MEET AASHTO CLEAR ZONE REQUIREMENTS FROM THE EDGE OF TRAVEL LANE.
7. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS.
8. USE GUARDRAIL TRANSITION, STD DWG BA 4A, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
9. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.
10. REFER TO THE GUIDELINES FOR CRASH CUSHIONS FOR SPECIFIC SYSTEM INFORMATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/16/02	F.W.	CORRECTED STD. DWG. CALLOUT FROM BA 2B TO BA 4A IN NOTE 6.
2	01/29/03	G.S.	REVISED DRAWINGS, MAKING TWO DRAWINGS AND REVISED ALL NOTES

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — APR.24,2003 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — APR.24,2003 DATE
DEPUTY DIRECTOR

GRADING & INSTALLATION DETAIL CRASH CUSHION TYPE H

STANDARD DRAWING TITLE

STD DWG
CC 8B

DGN File:N:\Esa\Standard Drawings\Imperial\Working\StandardsCommitteeFiles\CC08B.dgn
09-APR-2003

April 8, 2003

Prioritizing Standard Specifications and Drawings

When does an approved Standard Specification or Drawing become required and effective for use in projects?

The problem arises when a designer has packaged a project for advertisement and is ready to bring the project to the Complex or has delivered the project to the Advertising Section. Previous or during this time the Standards Committee approves changes to standards and the Standards Section processes the revised standards for posting. The question is, when does this change impact the project?

One discussion, with good merit, is to prioritized the changes by the Standards Committee at the time of approval:

Priority 1 being immediate upon posting and addendums will need to be processed for projects advertised.

Priority 2 being the revised standard would become effective a week or so after the posting.

This is one way in handling the impacts of revised standards on projects ready for advertisement.

Standard Committee Submittal Sheet

Name of preparer: Darrell Giannonatti

Title/Position of preparer: Director for Const/Mat

Specification/Drawing/Item Title: Scope of Work

Specification/Drawing Number: 00725

Date Process Started: Date Process Completed:

Status: ☐ Approved ☐ Disapproved ☐ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest

The standard specification's intent may not as clearly defined for contractor compensation for items of work that fall below 75%.

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

Issue deals with compensation to contractor by better defining calculation of payment. Should not be an M&P issue.

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

In-house (for example, materials, construction, safety, design, maintenance) (Include all applicable in-house areas)

Construction:
Recommendations are from Karl Verhaeren from Region 4. All region construction engineers have previously reviewed this topic in the region construction engineering meeting and are in agreement..

Construction Engineers

Karl Verhaeren, Robert Westover, Dennis Simper

Contractors

Suppliers

Consultants (as required)

Others (as appropriate)

D. Costs? (Estimates are acceptable.)

1. Additional costs to average bid item price.

None

2. Operational (For example, maintenance, materials, equipment, labor, administrative).

None

3. Life cycle cost.

None

E. Safety Impacts?

None

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

No History

SECTION 00725

SCOPE OF WORK

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 00555: Prosecution and Progress.

B. Section 01282 Payment.

C. Section 01355: Environmental Protection.

D. Section 01741: Final Cleanup

1.2 INTENT OF CONTRACT

A. Complete all work and furnish all resources and other incidentals required to complete the specified work.

1.3 VOLUNTARY PARTNERING

A. "Voluntary partnering" does not change the legal relationship of the parties to the Contract, and does not relieve either party from any of the terms of the Contract.

B. The Department encourages the formation of a strong partnership among the Department, the Contractor, and the Contractor's principal subcontractors. This partnership draws on the strengths of each organization to identify and achieve mutual goals.

C. To implement the partner initiative, the Contractor should contact the Department's Engineer within 30 days of Notice of Award and before the preconstruction conference. The Engineer facilitates a planning meeting to determine attendees, agenda, duration, and location of a partnering workshop.

D. Partnership are multilateral, and participation is totally voluntary. Both the Department and the Contractor agree to, and share equally any costs to accomplish the partnering.

E. Persons who should attend the workshop:
   1. Contractor's corporate level manager.
   2. Contractor and key project supervisory personnel.
   3. Principal subcontractors.
   4. Department's Deputy Construction Engineer.
   5. Department's Region Construction Engineer.
   6. The Engineer and key project personnel.
   7. The Project Design Engineer.
   8. The Project Manager.
   9. Local government personnel.
   10. Major utilities.

F. Follow-up workshops may be held periodically as agreed by the Contractor and the Department.

1.4 DIFFERING SITE CONDITIONS

A. During the progress of the work, if subsurface or latent physical conditions are encountered at the site, promptly notify the Engineer in writing of the specific differing conditions before the site is disturbed and before the affected work is performed. Conditions to report include:
   1. Conditions differing materially from those indicated in the Contract.
   2. Unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent to the work provided for in the Contract.

B. Upon written notification, the Engineer:
   1. Investigates the conditions.
   2. Determines if the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract.
   3. Notifies the Contractor whether or not an adjustment of the Contract is warranted. If warranted, makes an adjustment, excluding anticipated profits as follows:
      a. Adjustments in contract time are made in accordance with Section 00555, articles, "Determining Contract Time, and "Extending Contract Time."
      b. Payment is made under the provisions of Section 01282, article, "Differing Site Conditions, Changes, Extra Work," and articles concerning Force Account Work (General, Labor, Materials, Contractor-Owned Equipment, Rented or Leased Equipment, Subcontracts, and Statements).
   4. Modify the Contract in writing accordingly.

C. Department does not allow adjustments to the Contract that benefit the Contractor unless the Contractor has provided the required written notice as specified in this Section, article, "Notification of Differing Site Conditions, Changes and Extra Work."

1.5 SIGNIFICANT CHANGES IN THE CHARACTER OF WORK

A. The Engineer reserves the right at any time during the work to make written changes in quantities and alterations in the work that are necessary to satisfactorily complete the project.

B. Such changes in quantities and alterations do not invalidate the Contract or release the surety, and the Contractor agrees to perform the work as altered.

C. Department adjusts the Contract, excluding anticipated profits, if the alterations or changes in quantities significantly change the character of the work under the Contract.
   1. Such alterations or changes can be in themselves significant changes to the character of the work, or by their effect, can cause other work to become significantly different in character.
   2. The Department initiates and the Contractor agrees to the basis for the adjustment before the performance of the work.
   3. If a basis cannot be agreed upon, then the Engineer adjusts the contract either for or against the Contractor in such amount as the Engineer may determine to be fair and equitable.
   4. Department pays for the alterations in the work or changed quantities as provided in Section 01282, articles:
      a. Altered Quantities
      b. Differing Site Conditions, Changes, Extra Work
      c. Force Account Work (General, Labor, Materials, Contractor-Owned Equipment, Rented or Leased Equipment, Subcontracts, Compensation).
   5. If the directed changes require additional time to complete the Contract, Department adjusts the contract time in accordance with Section 00555, articles, "Determining Contract Time," and "Extending Contract Time."

D. If the alterations or changes in quantities do not significantly change the character of the work to be performed under the Contract, the Department pays for the altered work as provided elsewhere in the Contract.

E. The term "significant change" applies only to the following circumstances:
   1. When the character of the altered work differs materially in kind or nature from that involved or included in the original proposed construction, or
   2. When a major item of work, as defined elsewhere in the Contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity.
      a. Any allowance for an increase in quantity applies only to that portion in excess of 125 percent of the original contract quantity.
      b. Any allowance for a decrease below 75 percent applies only to the actual amount of work performed.
   3. When a minor item of work, as defined elsewhere in the Contract, is increased in excess of 150 percent or decreased below 50 percent of the original contract quantity.
      a. Any allowance for an increase in quantity applies only to that portion in excess of 150 percent of the original contract quantity.
      b. Any allowance for a decrease below 50 percent applies only to the actual amount of work performed.

1.6 SUSPENSIONS OF WORK ORDERED BY THE ENGINEER

A. If the Engineer suspends or delays in writing the performance of all or any portion of the work for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry), and the Contractor believes that additional compensation or contract time or both are due as a result of such suspension or delay, submit to the Engineer a written request for adjustment within 7 calendar days of receipt of the notice to resume work. Explain in the request the reasons and support for such adjustment.

B. Upon receipt of request, the Engineer:
   1. Evaluates the request.
   2. Adjusts (excluding profit) and modifies the Contract in writing accordingly, if the Engineer agrees that:
      a. The suspension increased the cost and/or time required for the performance of the Contract.
      b. The suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors at any approved tier.
      c. The suspension was not caused by weather.

3. The Engineer notifies the Contractor of whether or not an adjustment of the Contract is warranted.
    a. Department pays under the provisions of Section 01282, article, "Differing Site Conditions, Changes, Extra Work," and articles concerning Force Account Work (General, Labor, Materials, Contractor-Owned Equipment, Rented or Leased Equipment, Subcontracts, Compensation).
    b. Department adjusts contract time in accordance with Section 00555, articles, "Determining Contract Time," and "Extending Contract Time."

C. Department does not allow adjustment to the Contract unless the Contractor has submitted the request for adjustment within the time prescribed as specified in this Section, article, "Notification of Differing Site Conditions, Changes and Extra Work."

D. Department does not allow adjustments to the Contract under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this Contract.

1.7 NOTIFICATION OF DIFFERING SITE CONDITIONS, CHANGES AND EXTRA WORK

A. Promptly notify the Engineer of alleged changes to the Contract due to differing site conditions, extra work, altered work beyond the scope of the Contract, or actions taken by the Department that change the Contract terms and conditions.

B. Do not perform further work or incur further contract item expense relating to the claimed change after the date the change allegedly occurred, unless directed otherwise in writing by the Engineer.

C. Immediately notify the Engineer verbally of the alleged change or extra work occasioned by differing site conditions or actions by the Department. Provide the following applicable information to the Engineer in writing within 5 calendar days of the date the change or action was noted:
    1. The date of occurrence and the nature and circumstances of the occurrence that constitute a change.
    2. Name, title, and activity of each Department representative knowledgeable of the claimed change.
    3. Identity of any documents and the substance of any oral communication involved in the claimed change.
    4. Basis for a claim of accelerated schedule performance, if applicable.
    5. Basis for a claim that the work is not required by the Contract, if applicable.

D. Particular elements of contract performance for which additional compensation may be sought under this article include:
   1. Pay item(s) that has (have) been or may be affected by the claimed change.
   2. Labor or materials, or both, that are added, deleted or wasted by the claimed change and what equipment is idled or required.
   3. Delay and disruption in the manner and sequence of performance that has been or will be caused.
   4. Adjustments to contract prices, delivery schedules, staging, and contract time estimated due to the claimed change.
   5. Estimate of the time within which the Department must respond to the notice to minimize cost, delay, or disruption of performance.

E. The failure to provide required notice under this article constitutes a waiver of any and all claims that may arise as a result of the alleged change.

F. After notifying the Engineer, and in the absence of directions received to the contrary from an authorized representative of the Department, continue diligent prosecution of the work under the Contract to the maximum extent possible under the contract provisions.

G. Within 10 calendar days after receipt of notice, the Engineer responds in writing to the Contractor to:
   1. Confirm that a change occurred and, when necessary, direct the method and manner of further performance, or
   2. Deny that a change occurred and, when necessary, direct the method and manner of further performance, or
   3. Advise the Contractor that information necessary for deciding to confirm or deny the change has not been submitted, and indicate what information is needed for further review and date by which the Contractor should submit it to the Engineer. The Engineer responds to such additional information within 10 calendar days of receipt from the Contractor.

H. Any adjustments made to the Contract do not include increased costs or time extensions for delay resulting from the Contractor's failure to provide requested additional information under requirements of this article.

1.8 MAINTAINING TRAFFIC - GENERAL

A. Keep road(s) open to traffic during the work or provide and maintain detour roads as specified or directed.
   1. Keep publicly and privately used roadways in a condition that safely and adequately accommodates traffic 24 hours a day and 7 days a week.

2. Provide traffic control in compliance with the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), the Traffic Control provisions of the Specifications, and the Traffic Control Plans.
3. Maintain the sections of road undergoing improvement.

B. Do not park equipment and vehicles, or store materials in the median on divided roadways or within 10 feet from the outside edge of the driving lane.

C. Install guardrail so that uncompleted guardrail ends are not exposed to oncoming traffic. Diligently install or modify guardrails until complete.

D. Failure to comply with "Maintaining Traffic" is cause for the Department to take action to meet the safety requirements of this specification. Department deducts its costs incurred in such action from money due.

E. Snow removal is not be required during periods of winter shutdown or when the Department suspends construction operations. The Department does not additionally compensate for maintenance except for specific work directed by the Engineer. See this Section, articles, "Maintaining Traffic - Special Detours," "Maintaining Traffic - During Suspension of Work," and "Maintaining Traffic - As Directed by the Engineer."

1.9 MAINTAINING TRAFFIC - SPECIAL DETOURS

A. When the Contract includes "Maintenance of Detours" or "Removing Existing Structures and Maintaining Traffic," the payment covers all costs to construct, maintain, water for dust control, and to obliterate the detours, including the construction and removal of temporary bridges and accessory features.

B. The Department furnishes specified right-of-way for temporary highways or bridges.

1.10 MAINTAINING TRAFFIC - DURING SUSPENSION OF WORK

A. Keep sections of the project and temporary roadways passable and open to traffic during work suspensions.

B. Suspensions ordered by the Engineer: The Department maintains temporary roadways and portions of the project during work suspensions.
1. Resume maintenance for the entire project once work proceeds.
2. Replace or restore any work or materials lost or damaged because of temporary use of the project.

3. Remove work or materials used for temporary maintenance, and complete the project as though the work had been continuous and without interference.
4. Department pays for maintenance required for events beyond the Contractor's control during work suspensions at contract prices or as extra work.

C. Other Suspensions of Work: Maintain the roadway at no additional cost to Department to accommodate traffic during suspensions resulting from:
1. Seasonal or climatic conditions.
2. Failure to correct conditions unsafe for the workers or the general public.
3. Failure to carry out orders of the Engineer.
4. Any other reasons caused by the Contractor.

1.11 MAINTAINING TRAFFIC - AS DIRECTED BY THE ENGINEER

A. Department pays for special maintenance directed by the Engineer that is not included in the Contract for the benefit of the traveling public, per unit prices or under Section 01282, article, "Differing Site Conditions, Changes, Extra Work," and articles concerning Force Account Work (General, Labor, Materials, Contractor-Owned Equipment, Rented or Leased Equipment, Subcontracts, Compensation).

B. The Engineer determines the work to be classified as special maintenance.

1.12 RIGHTS IN AND USE OF MATERIAL FOUND ON THE WORK

A. Obtain approval before using excavated materials found on the work site that are suitable for completing other bid items of work. The Department pays for the quantity of excavated materials at the Contract unit price for roadway excavation and under the pay item for which the material is used.

B. Replace excavated material used for completing other bid items of work with acceptable material at no additional cost to the Department.
1. Department does not charge for the materials used.
2. Obtain approval before excavating material outside grading limits but within the highway right-of-way.
3. Compact replacement material to the density requirements specified for roadway embankment construction.

C. Structure materials designated for removal may be used temporarily in the work.

1.13 FINAL CLEANUP

A. Clean the highway, the project, borrow, and local material sources and all areas occupied in connection with the work of all rubbish, excess materials, temporary structures, and equipment, etc. before final inspection and acceptance.

B. Final cleanup cost is incidental to other items. Refer to Section 01741.

1.14 RESTORATION OF SURFACES OPENED BY PERMIT

A. Allow individuals, firm or corporation with authorized permits to enter the project to construct or reconstruct any utility service.

B. Repair damage caused by the permit holder when directed. Department pays for repair work as extra work, or as provided in the Contract.

1.15 RAILWAY - HIGHWAY PROVISIONS

A. The Department arranges with the railway for new crossings or for existing crossings used during the work.

B. Obtain approval from the railway and pay for the use of crossings not specified in the Contract.

C. Avoid accidents, damage, unnecessary delay, or any interference with the movement of trains, traffic of the railway company, or other property.

D. Department does not reimburse for railroad flagging and inspection.

E. Hold a preconstruction conference and give written notice to the Manager of Industry and Public Projects or equivalent position for the railroad company, when railroads are involved, at least 15 days before beginning any construction work on railroad right-of-way. Coordinate a work schedule based on the actual date both parties can begin work.

F. Give at least 48 hours verbal notice to the Manager of Track Maintenance or equivalent position for the railroad company having responsibility for the area the project is in before beginning work once the work dates have been established.

G. Give written notification to the Superintendent or equivalent position least five days before any cancellation of work, and 15 days before continuing work.

H. Execute a Right-of-Entry Agreement with the railroad company prior to performing any work within the railroad's right-of-way. Send executed copies of this agreement to the Engineer and UDOT's Region Utilities and Railroads Coordinator.

I. Cleanup the right-of-way to the satisfaction of the railroad company. Contractor pays for any cleanup done by the railroad company to the railroad company's right-of-way that should have been done by the Contractor.

J. Flagging and inspection is done by railroad company personnel when work and/or equipment of the Contractor is within 25 feet of any of the railroad company's tracks.

K. Determine the cost of required railroad flagging and/or inspection and cleanup crew. Include these costs in mobilization.

L. UDOT deducts payment under a construction accounting item for "Railroad Flagging, Inspection and Cleanup," and pays the railroad directly for verified billings. No other compensation to the Contractor for this item is allowed.

M. Refer to project plans for names of railroad companies.

1.16 CONSTRUCTION OVER OR ADJACENT TO NAVIGABLE WATERS

A. Do not interfere with the navigation of waterways when conducting work over, on, or adjacent to navigable waters.

B. Comply with all conditions of the permit from the U.S. Coast Guard or the U.S. Army Corps of Engineers.

1.17 CONTRACTOR'S RESPONSIBILITY FOR WORK

A. Protect the work against injury or damage from all causes whether or not related to performing the work until written acceptance of the project is given, except as provided in this Section, article, "Suspensions of Work Ordered by the Engineer."

B. Pay to rebuild, repair, restore, and make good all losses, injuries, or damages to any portion of the work from any cause before receiving final acceptance.
   1. Exclude from payment any loss, injury, or damage to the work from event beyond the Contractor's direct control including acts of God or other cataclysmic phenomena of nature, acts of the public enemy, or acts of governmental authorities.

C. When work is suspended for any cause:
   1. Protect the project from damage.
   2. Provide for normal drainage.
   3. Erect any necessary temporary structures, signs, or other facilities.
   4. Maintain all newly established plantings, seedings, and soddings and protect new tree growth and other designated vegetative growth in acceptable condition.
   5. For reimbursement for costs incurred in periods of suspension, refer to this Section, article, "Maintaining Traffic - During Suspension of Work."

1.18 ENVIRONMENTAL PROTECTION

A. Refer to Section 01355.

1.19 VALUE ENGINEERING - CONTRACTOR PROPOSALS

A. Savings resulting from a Value Engineering Change Proposal (VECP) offered by the Contractor and approved by the Department is shared equally.

B. Base contract bid prices on specified work rather than on VECPs that are subject to Department approval. If a VECP is rejected, complete the Contract as bid.

C. The Department considers proposals that may potentially result in savings without damaging essential functions and characteristics of the facility, including but not limited to service life, economy of operation, ease of maintenance, desired ability, safety, and approximate estimated savings.

1.20 VALUE ENGINEERING - SUBMITTING PROPOSALS

A. Submit the following materials and information with each proposal:
   1. A statement that the submission is a VECP.
   2. A description of the existing work and the proposed changes for performing the work. Discuss the comparative advantages and disadvantages of each.
   3. A complete set of plans and specifications showing proposed revisions to the original Contract.
   4. A detailed cost estimate for performing the work under the existing Contract and under the proposed change.
   5. A time frame within which the Department must make a decision.
   6. A statement of the probable effect the proposal would have on the contract completion time.
   7. A description of any previous use or tests of the proposal, the conditions, and the result and the dates, project numbers, and the Department's action on the proposal if previously submitted.

B. The Department determines and notifies the Contractor within 5 working days that there is insufficient review time for a response.

C. The Department evaluates the need for a non-compensable delay adjustment to the Contract based on additional review time necessary and its effect on the Contractor's schedule.

D. The Contractor has no claim against the Department for compensable or noncompensable delay resulting from the failure to respond within the time indicated in this Section, article, "Value Engineering - Submitting Proposals," when additional information is necessary to complete the review.

1.21 VALUE ENGINEERING - CONDITIONS FOR PROPOSALS

A. The Department only considers VECPs that meet the following conditions:
   1. Value Engineering proposals, regardless of their approval by the Department, apply only to the current proposal and become property of the Department.
      a. Submit proposals without restrictions on use or disclosure.
      b. The Department may duplicate or disclose any data necessary to use the proposal.
      c. The Department can apply a proposal for general use on other Contracts it administers.
      d. The purpose of this provision is to ensure legal right with respect to patented materials or processes.

B. Use only proven features that have been employed under similar conditions or projects acceptable to the Department.

C. The Department decides whether or not to accept a proposal. Basis for proposal rejection include requirements for excessive review, evaluation, and/or investigation, or inconsistency with project design policies or criteria.

D. The Department rejects proposals that:
   1. Provide equivalent options to those already in the Contract.
   2. Change only pavement structure thickness or type.

E. The Department **may** reject proposals that:
   1. Contain revisions the Department is already considering or has approved for the Contract.
   2. Do not generate sufficient savings.
   3. Do not provide additional information as requested by the Department including requests for field investigation results and surveys, design computations, and field change sheet for proposed design changes.

F. If the proposal is rejected, the Contractor has no claim to additional costs or delays, including development costs, loss of anticipated profits, or increased material or labor costs.

G. The Engineer can reject all unsatisfactory work resulting from an approved proposal.
   1. Remove rejected work and reconstruct under the original contract provisions at no additional cost to Department.
   2. Reimbursement for modifications to the proposal to adjust field or other conditions is limited to the total amount of the contract bid prices.
   3. Rejection or limitation of reimbursement is not basis for any claim against the Department.

H. The Department does not consider savings generated by contingency items when it is reduced as part of a VECP, unless it can be tied to a reduction in contract time.

1.22 VALUE ENGINEERING - PAYMENT

A. The Department pays by change order for Value Engineering proposals accepted in whole or in part. Department pays as follows:
   1. The Contract incorporates changes in quantities of unit bid items, and/or new agreed price items, as appropriate.
   2. Department pays directly for cost of the revised work. The Department pays the Contractor 50 percent of the savings reflected by the difference between cost of revised work and the original bid price.
   3. Department does not reimburse costs to develop, design, and implement the proposal.
   4. Only a Contractor may submit proposals and be reimbursed for savings. The Contractor can submit proposals for an approved subcontractor.

PART 2 PRODUCTS Not used

PART 3 EXECUTION Not used

END OF SECTION

Change One - August 29, 2002
No changes made

Change Two - December 19, 2002
No changes made

Change Three – February 27, 2003
No changes made

Change Four – April 24, 2003
Articles Revised
1.5 E 2 b
1.5 E 3 b

Standard Committee Submittal Sheet

Name of preparer: Jason Richins, Bill Butterfield, Craig Wright
Title/Position of preparer: Rotational Engineer
Specification/Drawing/Item Title: POLYMER CONCRETE JUNCTION BOX
Specification/Drawing Number: SECTION 13554
Date Process Started: 2/17/03 Date Process Completed:
Status: ‘ Approved ‘ Disapproved ‘ Sent Back For Review

Sheet not required on editorial or minor changes to standards.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard, or what has caused a new or changed item of interest.

The references need to be updated.

Part 2.1.A, Special termination kits are mainly used with prefabricated holes. In our applications we don’t always know where the conduit will enter the boxes. We would like to add that they use grout around the conduit to seal the box.

Part 2.1.D, both Carson and Quazite say that their boxes should not be in deliberate traffic. Christy provides a reinforced concrete box with a cast iron ring and lid.

Part 2.1.F, Should say “Provide Pre-fabricated boxes” instead of “Fabricate junction boxes”. We thought that it meant in the field fabricate these boxes. However it would be impossible to fabricate polymer concrete boxes in the field. This will make it a little clearer.

Part 2.2.E, provide the option to use a box with a floor. We would rather not see the conduit enter in from the bottom, but rather from the sides of the box. If there are a lot of conduits entering a box it better be bigger than a type I or II.

Part 2.2.H, More clarification on the lid markings. The NEC code doesn’t differentiate between voltages to label boxes. If it has power for ITS equipment, it should be labeled “Electric”.

Part 3.1.B, note 3 was added.

Part 3.1.I, Conduit should enter through the sides and not from the bottom. This will eliminate the chance of smashing the fiber with the lid or catching the fiber on the lip that the lid sits on a crushing the fiber.

For the Junction Box Drawing (AT 7) the changes are noted in the revision box.

.

B. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

Same as it is now.

C. Stakeholders? From the list provided, document the stakeholders contacted, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

In-house (for example, materials, construction, safety, design, maintenance) (Include all applicable in-house areas)

UDOT Materials; Bill Lawerence contacted by phone about the references.
UDOT ITS; Bill Butterfield - ITS inspector - suggested changes to the spec.
UDOT ITS; Craig Wright- fiberoptics - Suggested changes.
UDOT ITS; Bob Strong
UDOT ATMS Maintenance; Jim Kaymmeyer
UDOT ATMS Maintenance; Guy Buckner
UDOT Traffic & Safety; Larry Montoya
Region 3 Signal Coordinator; Grant Jackson
Region 1 Signal Coordinator; Dale Lake
Region 4 Traffic Engineer; Troy Torgerson
Region 4 Signal Coordinator; Clay Cottam
Region 2 Traffic Engineer; Deryl Mayhew
Region 2 Inspection; Lee Simmon

Construction Engineers
Robert Westover Region 3 Construction Engineer

Contractors
Cache Valley; Mark Longo suggested that the conduit be allowed to enter the bottom of the box for multiple (6 or more) conduits. RESPONSE: If we have six or more conduits the truth is the type II box isn't big enough.
Hidden Peak; Derek Lee

Suppliers
Carson Industries in person, phone and email
Quazite by phone and email

Consultants (as required)

Others (as appropriate)

D. Costs? (Estimates are acceptable.)

1. Additional costs to average bid item price.

The additional cost would be the cost difference of the two type II sizes.

2. Operational (For example, maintenance, materials, equipment, labor, administrative).

Same slightly more concrete and free draining granular backfill borrow.

3. Life cycle cost.

E. Safety Impacts?

The boxes are not to be used in deliberate traffic areas. If they are used there they probably won't hold up. We have changed the standard to not give the option of putting boxes in the roadway.

F. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

SECTION 13554

POLYMER CONCRETE JUNCTION BOX

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnish and install polymer concrete junction box, ground rod, and maintenance marker.

1.2 RELATED SECTIONS

A. Section 02056: Common Fill

B. Section 02061: Select Aggregate

C. Section 02842: Delineators

D. Section 02892: Traffic Signal

E. Section 03055: Portland Cement Concrete

1.3 REFERENCES

A. ASTM C 109: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm cubes).

B. ASTM C 496: Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

C. ASTM C 579: Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

D. ASTM C 580: Standard Test Methods for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

~~C~~E. ASTM C 1028: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.

~~D~~F. ASTM D 543: Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.

~~E~~G. ASTM D 570: Standard Test Method for Water Absorption of Plastics. Polymer Concrete Junction Box

H~~F~~. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastic in a Horizontal Position.

I~~G~~. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Insulating Materials.

H~~J~~. ASTM G 154: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.

~~I~~K. ANSI/UL 467: Grounding and Bonding Equipment.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide special termination kits from the conduit manufacturer for terminating the conduit in junction boxes. Provide kits that form a watertight seal of conduit to structure wall or grout around the conduit. The grout's finish will be smooth and flush with the interior wall.

B. Use free draining granular backfill borrow as per Section 02061.

C. Use granular backfill borrow per Section 02056.

D. Provide maintenance markers for junction boxes along freeways and expressways.

E. Provide concrete AA(AE) for concrete collar. Refer to Section 03055.

F. Provide pre-~~F~~fabricate junction boxes per the size and type specified in the plans. Boxes are made from polymer concrete.

G. Use body, ring, and lid meeting the physical and chemical requirements listed in Table 1:

Table 1

Property	ASTM Test	Value
Compressive Strength	C 109	11,000 psi
Flexural Strength	D 790	7500 psi
Tensile Strength	C 496	1700 psi
Effects of Acids	D 543	Very Resistant
Effects of Alkalies	D 543	Very Resistant

H. Provide all components with ultraviolet inhibitors per ASTM G 154.

I. Provide all components flame-resistant per ASTM D 635.

2.2 JUNCTION BOXES AND LIDS

A. Provide junction boxes and vaults that resist water absorption in accordance with ASTM D 570.

B. "Load Rating 3" for Non Wheel Loading Accessible, Behind Sidewalk
   1. In area behind sidewalk, provide boxes, rings, and lids that sustain a minimum vertical test load of 12,000 lbs over a 10 inch x 10 inch square.

C. "Load Rating 2" for Incidental Vehicular Traffic:
   1. In area not in traveled way, provide boxes, rings, and lids that sustain a minimum vertical test load of 22,500 lbs over a 10 inch x 20 inch square.
   2. Provide concrete collar per Standard Drawing AT-7 for all boxes that may experience incidental traffic.

D. "Load Rating 1" for Deliberate Vehicular Traffic:
   1. ~~In traveled way, or i~~In any paved area immediately adjacent to the mainline, such as shoulders, snow storage areas, or vehicle pullout areas, provide boxes, rings, and lids that sustain a minimum vertical test load of 45,000 lbs over a 10 inch x 20 inch square.
   ~~2. Provide steel ring and steel lid.~~

E. Provide a poured-in-place 1 inch thick grout floor, with a 1 inch diameter drain, for all type I-PC, II-PC, and III-PC boxes or a box with a prefabricated floor with a 1 inch drain hole.

F. Provide lid for all junction boxes as specified by application.

G. Provide lids with a non-skid surface with minimum coefficient of friction of 0.50, per ASTM C 1028. Coatings will not be approved.

H. Lids will be manufactured with the following markings in the logo area, in 1 inch recessed letters: ~~Mark the junction box lid in the logo area with 1 inch letters:~~

1. "Traffic Signal" when the junction box contains cables or wires for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.

2. "~~Traffic Signal~~Electric" when the junction box contains power conductors ~~under 480 V~~ used for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.

~~3. "Electric - 480 V" contains power conductors at 480 V used for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.~~

34. "Street Lighting" when the junction box contains street lighting conductors only. Inscribe "High Voltage" below the words "Street Lighting" when the junction box contains voltage above 600 V.

45. "Communication" when the junction box contains multiduct conduit for future use.

56. "Sprinkler Control" when sprinkler control conduit enters the junction box.

I. Provide lids with recessed access point to allow removal of cover with a hook or lever. Damage to the pulling point in the lid must be repaired.

J. Provide lids with vandal-resistant stainless steel recessed bolts.

2.3 MAINTENANCE MARKERS

A. Steel posts: Refer to Section 02842.

2.4 BACKFILL

A. Compact free draining granular backfill borrow under junction boxes. Refer to Section 02061.

B. Compact granular backfill borrow around boxes. Refer to Section 02056.

2.5 DUCT SEAL

A. Waterproof, rodent proof, non-corrosive, non-oxidizing, and non-hardening when subject to temperatures ranging from -13 degrees F to 150 degrees F. Do not use foam sealant.

2.6 GROUND ROD

A. Copper-coated steel as specified.

B. ANSI/UL 467.

2.7 GROUND WIRE

A. Ground Wire: Refer to Section 02892.

PART 3 EXECUTION

3.1 JUNCTION BOX AND EXTENSION

A. Install per manufacturer's recommendations.

B. Cast conduit holes in junction box at the time of precasting or drill at the time of placement with no structural damage to the box.

1. Holes drilled in junction box must not be more than 1/4 inch larger than conduit diameter.
2. Seal conduit ends inside all junction boxes with at least 2 inch thick duct caulking after wires are installed.
3. Vacant conduit will be sealed with 2 inch thick duct caulking or a manufactured plug designed for that purpose.

C. Place the top of the junction box flush with the surrounding grade or set at the planned finished grade.

D. Hand tamp the granular backfill borrow material around the junction box. Match the top 4 inches to the composition, density, and elevation of the surrounding surface.

E. Do not install junction boxes inside of railroad right of way.

F. Field locate junction boxes to avoid steep slopes and low lying locations with poor drainage.

G. Do not install junction boxes within the traveled way, shoulders, or on approaches to signal poles.

H. Do not install conduit in corner of junction box, or within 2 inches of corner of junction box. Extend multiduct conduit 6 inches (nominal) beyond the inside wall of the junction box. Extend all other non-multiduct conduit 2 inches minimum to 3 inches maximum beyond the inside wall of the junction box. Refer to Standard Drawing AT-7.

I. Conduit will enter through the sides of the box and not from the bottom. The conduit is to be placed at least 2" above the poured-in-place grout floor. ~~Extend conduit entering through bottom of junction box 4 inches above the top of floor.~~

J. Orient the recessed access point in a location which provides both leverage and safety.

K. Saw cut concrete or other improved surfaces that require removal in the sidewalk area. Remove entire section of sidewalk. Replace with in-kind materials to match the existing grade.

L. Provide 12 inches deep free draining granular backfill borrow directly under junction box.

M. Install expansion joint material around entire periphery of ring for junction boxes installed in paved surface.

3.2 CONCRETE COLLAR

A. See Standard Drawing AT-7.

B. Concrete: AA(AE). Refer to Section 03055.

C. Do not install concrete collar for junction boxes in paved surface. Install concrete collars in areas of incidental traffic.

3.3 GROUND ROD

A. Install ground rod to extend maximum 2 inches above box floor.

B. Attach ground wire or locator wire with clamps.

3.4 RESTORATION

A. Restore all areas damaged during the installation of the junction boxes.

END OF SECTION